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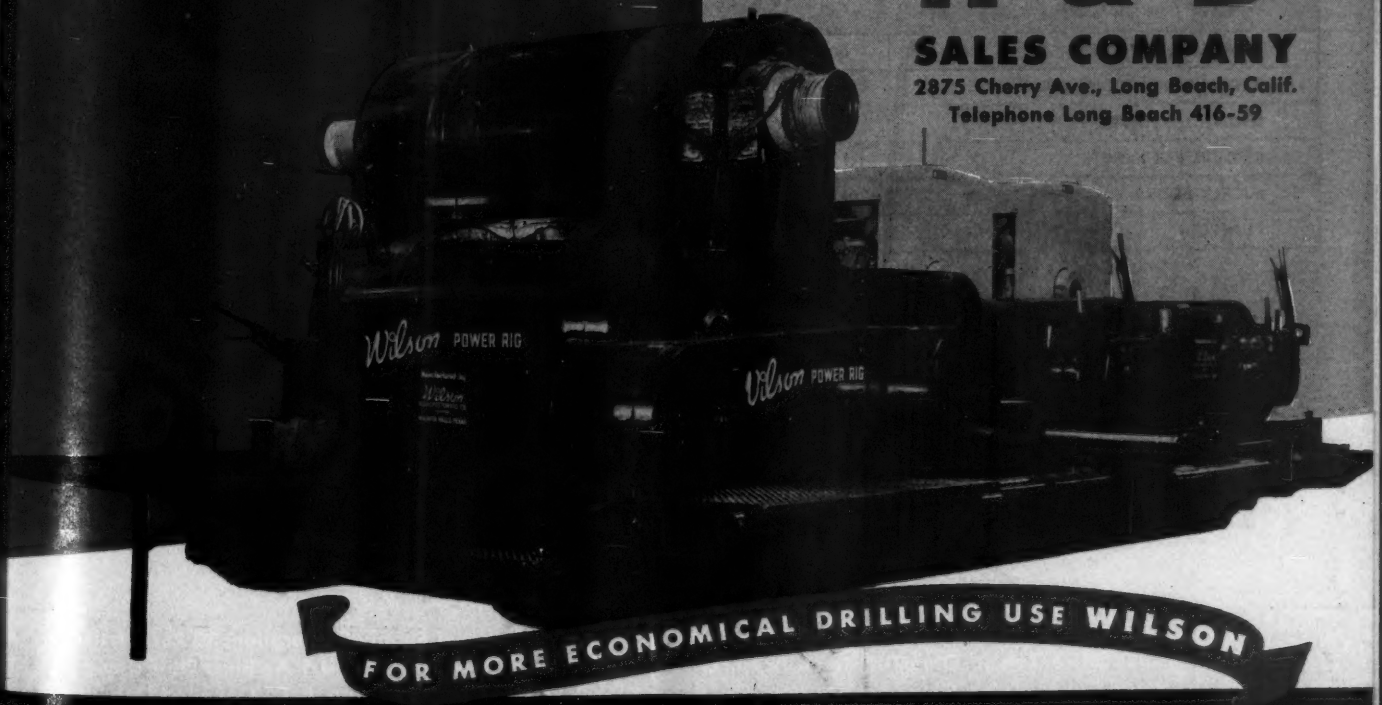

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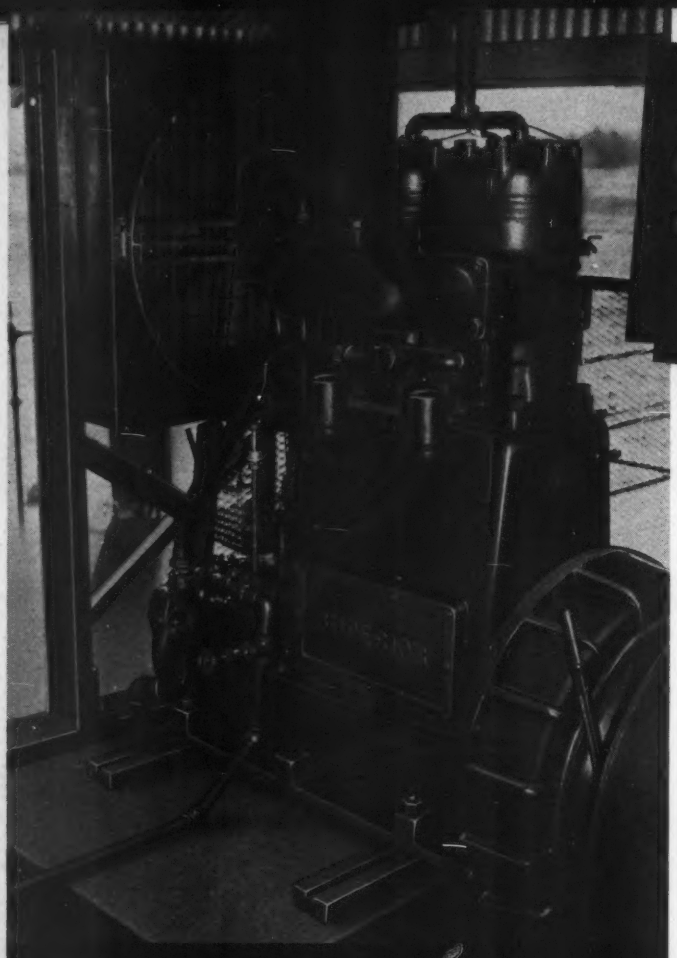

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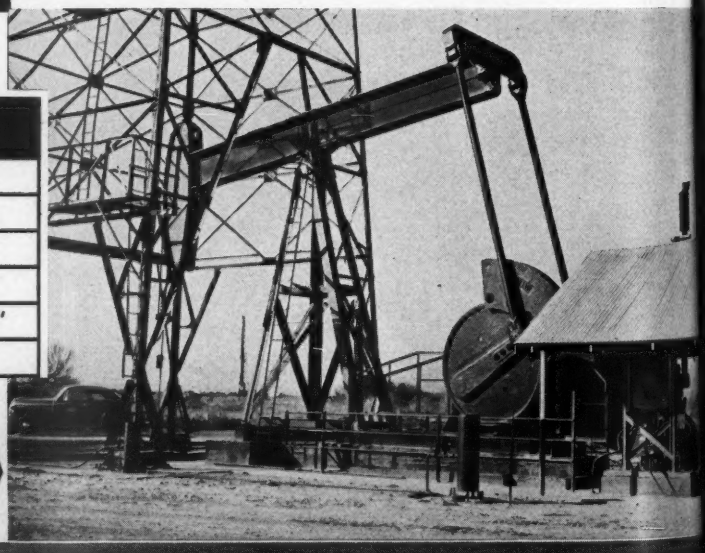

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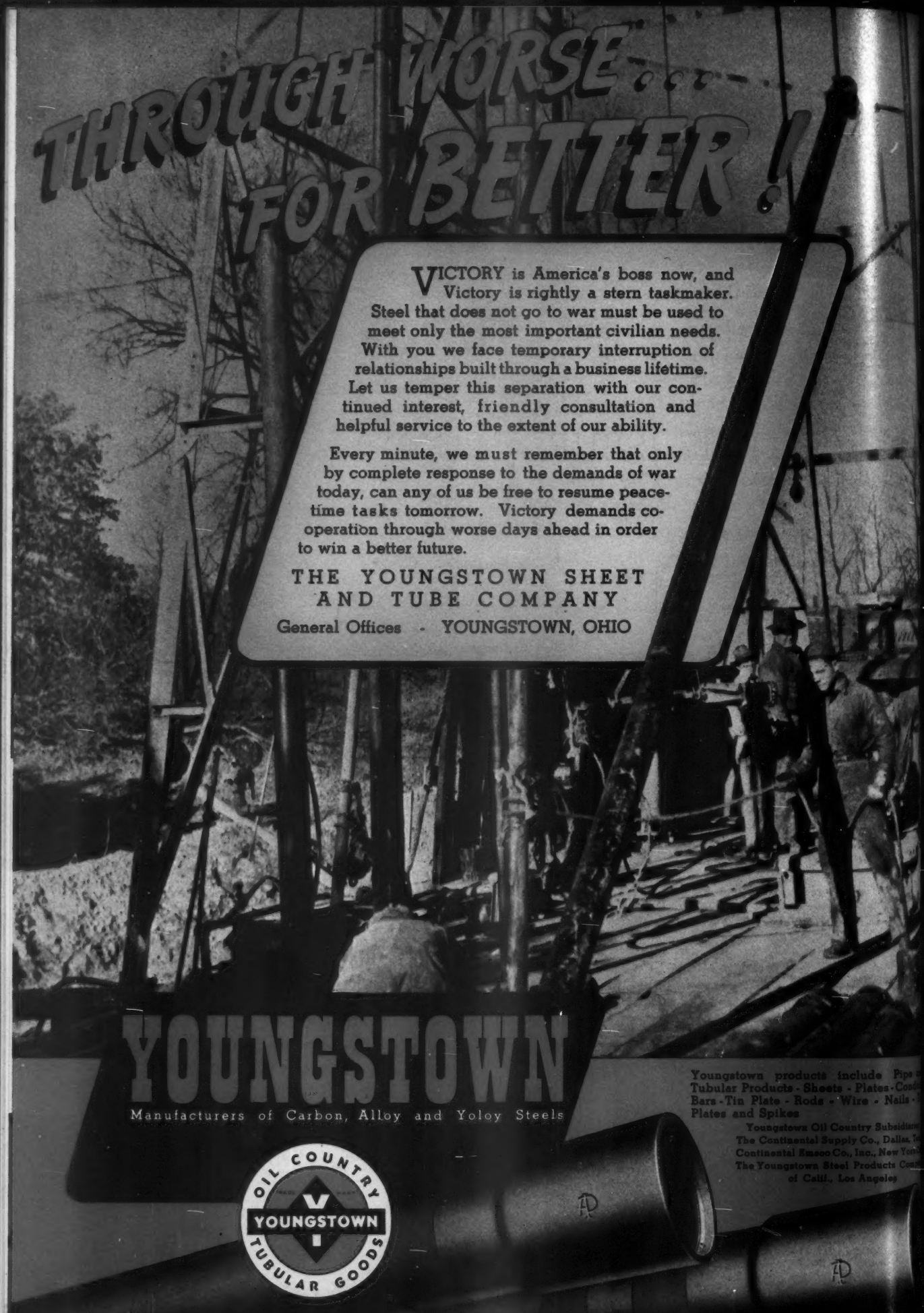
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North Midway Area of Midway-Sunset Oil Field

By W. T. Woodward*

History

Some twenty-eight wells had been drilled in the subject area when U. S. G. S. Bulletin 406 ("McKittrick-Sunset Oil Region", by Ralph Arnold and Harry A. Johnson) went to press. Only brief mention of this early development may be found in this 1910 publication which has become a standard reference work.

Roughly, seventy-five per cent of present development had been achieved by 1920, when U. S. G. S. Professional Paper 116 ("Sunset-Midway Oil Field" by R. W. Pack) was released. This latter publication treats the area with great detail, and like Bulletin 406 is a standard reference.

Records show that several wells in the southeastern portion of the area originally flowed several thousand barrels of oil per day—one well produced in excess of 10,000 B/D. However, wells along the southwest and northwest edges of present development yielded as little as 5 B/D.

The area represents one of the major oil deposits of the great Midway-Sunset Oil Field and probably is the most underdeveloped portion of that field. Development of present proven lands and extensions of productive boundaries, coupled with the slow drainage characteristic, should assure a long productive life for the area.

Stratigraphy

Most of the area is covered by alluvium and stream terraces (Recent) which the Tulare (Pleistocene) formation's fresh water beds underlie, occasionally exposed in the intermittent stream cuts. The Tulare beds lie in unconformable contact with the outcropping "Reef Ridge" (Miocene) formation along the southwest edge of present development. (See accompanying map).

Well data indicate a very thin section of the San Joaquin Clay (Pliocene) formation underlying the Tulare beds in the northeast portion. The San Joaquin Clay beds are more numerous in the southeast portion. (See accompanying geologic sections). The underlying Etchegoin (Pliocene) formation is likewise present under the northeast and southeast portions and is underlain by the "Reef Ridge" formation, presumably unconformably.

The alluvium and terrace material consists of mostly a buff colored sandy clay matrix enclosing siliceous shale, chert, granite, and quartzite granules, pebbles, cobbles and boulders.

The Tulare beds are buff to tan or green clays interbedded with material similar to the terrace deposits.

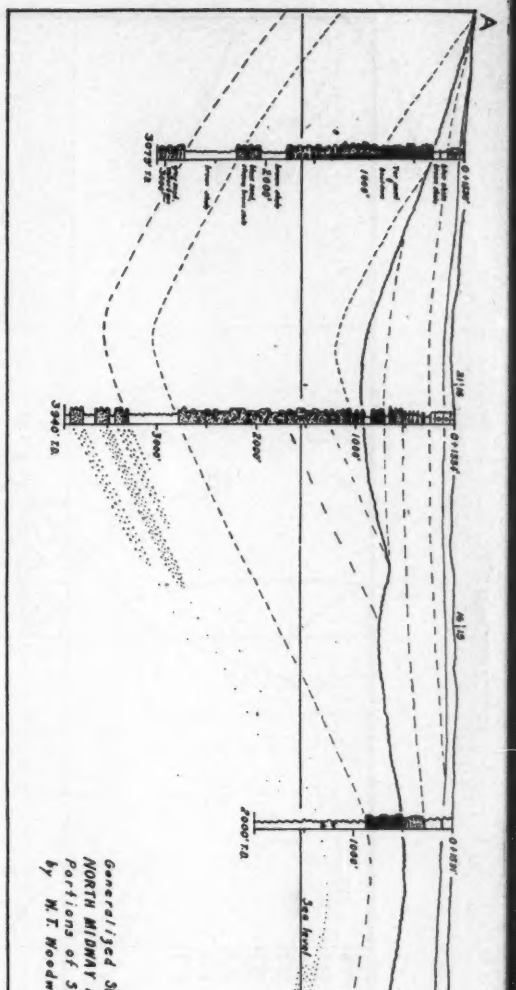
Blue and green-gray clays, and gray, fairly well sorted quartz sands carrying marine fossils make up the San Joaquin Clay beds.

The Etchegoin formation is composed of green sandy clays and gray well sorted quartz sands containing marine fossils.

Soft, diatomaceous, brown-gray shale and granitic, poorly sorted sand and gravel characterize the "Reef Ridge" formation.

Structure

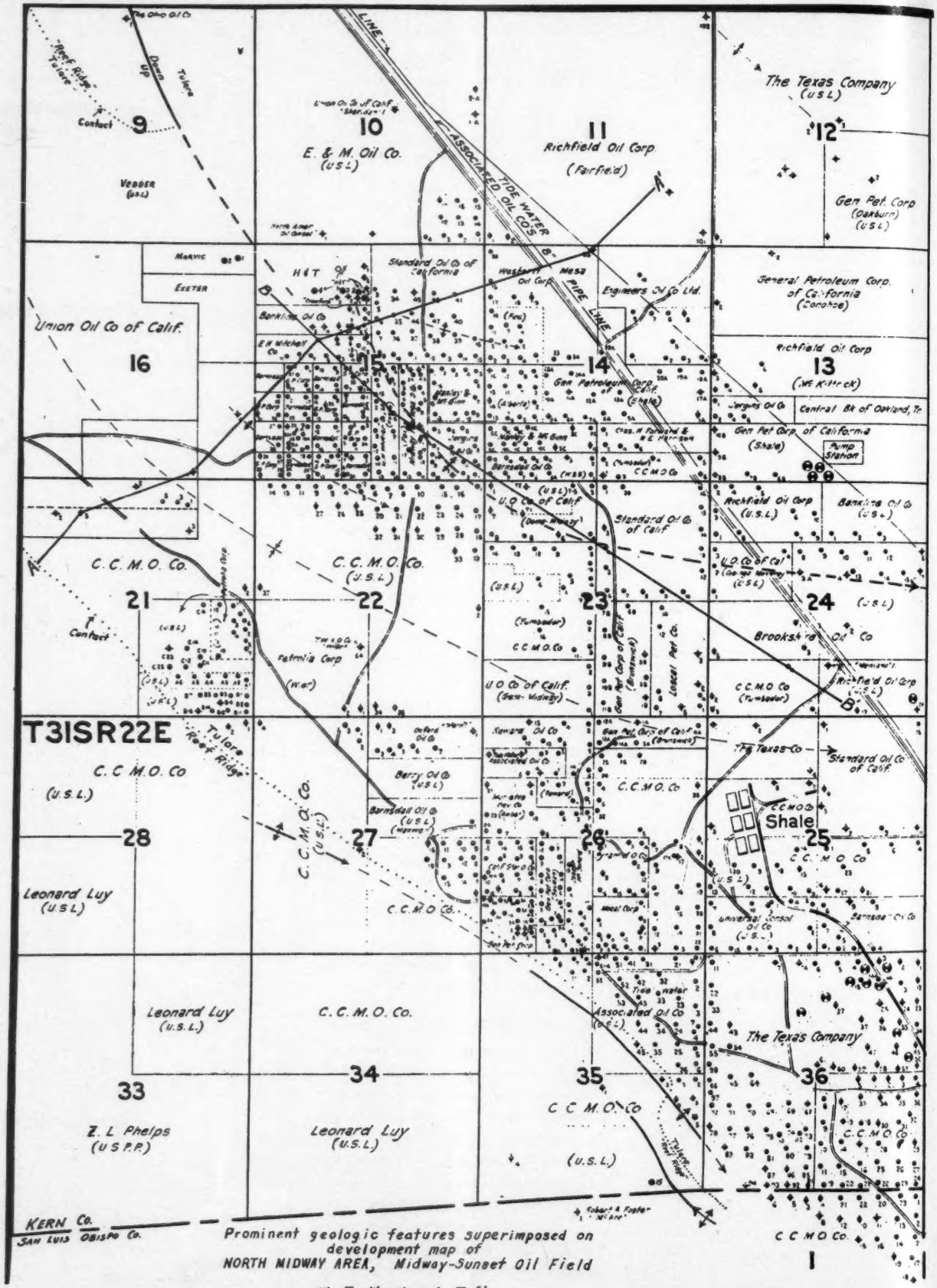
The accompanying map and geologic sections illustrate the major structural features of the North Midway Area. The accumulations are almost invariably due to overlaps with oil trapped in Etchegoin, San Joaquin Clay and Tulare sands generally buttressed against the truncated "Reef Ridge" formation. Sands of the "Reef Ridge" probably constitute the chief reservoir along



Generalized SW-NE. Geologic Section of western portion of NORTH MIDWAY AREA of Midway-Sunset Oil Field, Kern Co, Calif. Portions of Secs. 21, 16, 15, 14, & 11, T. 31 S., R. 22 E., M. D. M. by W. T. Woodward

*Petroleum Engineer-Geologist, Taft.

(A similar paper was prepared to form a part of Bulletin 118, Geologic Formations and Economic Development of the Oil and Gas Fields of California", (now in press) prepared under the direction of Dr. Olaf P. Jenkins, Chief Geologist, Geologic Branch, California State Division of Mines. It is reproduced herewith through the courtesy and permission of Walter W. Bradley, State Mineralogist.)



Prominent geologic features superimposed on development map of NORTH MIDWAY AREA, Midway-Sunset Oil Field

W. T. Woodward, Taft

the western and southwestern edges, being in turn overlapped by the younger formations.

The area is situated at the foot of the northeast flank of the Temblor Range, adjacent to the very complex McKittrick disturbance. The otherwise normal southeast plunging tributary folds are somewhat faulted.

Due to the fact most of the wells were drilled before the days of coring, it is nearly impossible to make detail correlations or draft a satisfactory contour map from the old cable-tool-drilled well logs. However, recently drilled, cored wells allow reasonable interpretation of the various horizons.

Production

Oil production is obtained from the "Reef Ridge", Etchegoin, San Joaquin Clay, and Tulare formations. It is only natural that the gravity of the product has a wide range, from 11 to 27 degrees. The estimated average daily oil production per well is 15 barrels, and the average gravity about 16 degrees.

Gas is very often present in quantities sufficient to provide fuel for pumping equipment.

Considerable water accompanies the oil; saltwater from the Etchegoin and San Joaquin Clay horizons and sulphur water from the Reef Ridge and Tulare formations.

Sand in great quantities has been brought to the surface by wells in the western and southwestern portions, causing numerous mechanical failures.

Recent Developments

Most of the old shallow producers in Section 15, 31/22 obtain production from a varying thickness of oil sand at, or adjacent to, the contact of the "Reef Ridge" brown shale and sand formation with overlying Pleistocene Tulare beds. Pliocene Etchegoin and San Joaquin Clay beds may be present in part. During the early part of 1941, the H & T Oil Company cleaned out and deepened one of a group of abandoned, shallow producers situated on the north half (N½) of the northwest quarter (NW¼) of Section 15. This "H & T" No. 1 well penetrated "Reef Ridge" (Miocene) brown shale some 300 feet and discovered a new oil sand zone. Successful completion of this discovery well led to additional drilling in Sections 15 and 16, with reported initial productions in excess of 75 B/D of 13 gravity clean oil. Considerable sand and a negligible amount of water accompany the oil production.

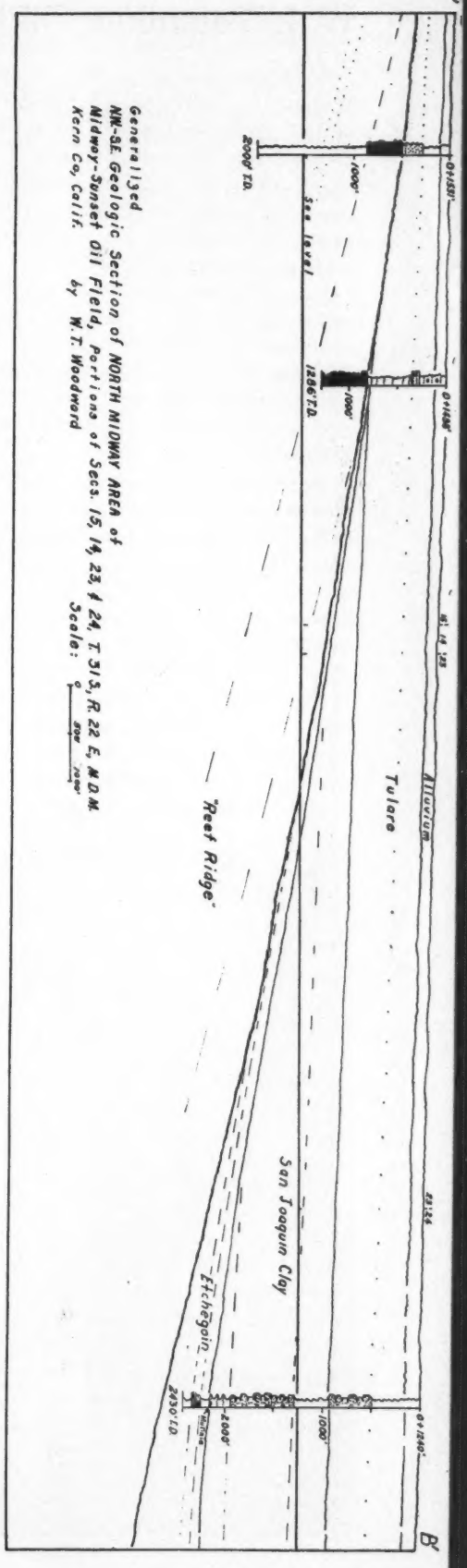
The oil sand zone has been penetrated some 274 feet to date. The new productive horizon consists of poorly sorted, silty to very coarse sand and cobbles—chiefly granitic fragments; poorly consolidated and well saturated with heavy black oil. There are occasional interstratified beds of brownish gray, poorly sorted, sandy, diatomaceous shale. Mica and carbonaceous materials are common occurrence.

The thickness and lateral extent of the new productive horizon have not been determined.

At the turn of the year the C. C. M. O. Company was testing a northwest-plunging-anticlinal structure in the southeast quarter (SE¼) of Section 35, 31/22. The anticline is productive about two miles distant, southeast, a development known as the Republic Area. The C. C. M. O. test well, No. 15, encountered oil sands (probably upper Middle Miocene) at a horizon and depth comparable to the oil zone of the Republic Area. The well was completed for a reported initial production of 75B/D of 12 gravity oil, along with 64B/D of water, from a depth of 2545 to 2853 feet.

The steep dips encountered suggest a flank position. There appears to be small likelihood that the horizon will be productive farther northwest than the center of Section 35. It is entirely possible, however, that the sands will prove productive for a considerable distance southeast.

No doubt other new areas and zones of production will be discovered in the North Midway Area of the Midway-Sunset Oil Field in the present acceleration of drilling activity.



W. L. Valentine, Oil Pioneer Passes Away

With the passing on May 9 of William L. Valentine, 72, founder of the Fullerton Oil Co., another member was taken from the thining ranks of that colorful group of pioneer oil men who established the petroleum industry as California's leading industrial enterprise.

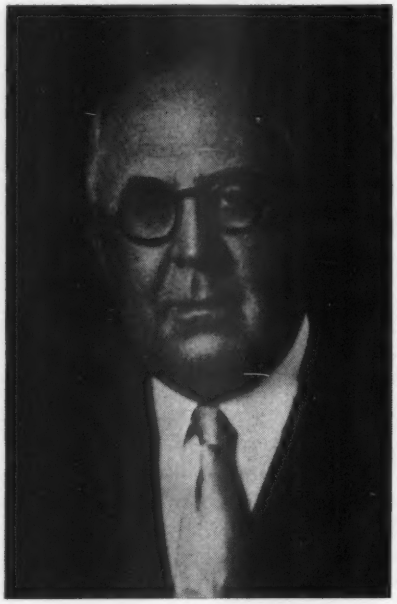
Mr. Valentine had been in ill health for the past two years but continued an active interest in his company as well as the many civic, charitable and fraternal activities with which he was associated during his lifetime.

He was a contemporary of the men who founded or developed several of the largest units in the petroleum industry, having begun his career in oil in 1899 with the successful development of extensive producing properties in the Olinda area of Orange County.

In 1900 he merged the Fullerton Oil Co., a California corporation, with the Fullerton Oil Co., an Arizona corporation. Electing to place the presidency of the company in the hands of John J. Fay, Jr., president of a Los Angeles bank.

In addition to the Olinda development, his company pioneered other producing areas in eastern Orange County and was active in other California producing areas. In 1912, with his California operations well established, he undertook prospect work in Wyoming which resulted in the discovery of the Grass Creek field in that year. Properties were acquired later in New Mexico and in March, 1942, his company discovered the Fullerton pool in Andrew's County, West Texas, extending the company's operations into four states.

Mr. Valentine was born at Noyo, Mendocino County, Calif., on March 8, 1870, the son of William Valentine and Susan Lucas Valentine. He started his business career in San Francisco with Easton Eldridge and Co., a real estate firm, and in 1893 moved to Los Angeles to manage the firm's activities in this area.



W. L. Valentine

The first enterprise outside the oil industry to attract his interest was the Automobile Club of Southern California. He served on the club's board of directors from March 1, 1910 until the time of his death and was president of the organization from 1921 to 1926. He became a director of the Security-First National Bank of Los Angeles in 1912 and served continuously thereafter.

From 1925 to 1929 he served as a director of the Los Angeles Branch of the Federal Reserve Bank of San Francisco, and was board chairman from 1926 to 1929.

Mr. Valentine also served for a number of years as treasurer of J. W. Robinson Co. and held the presidency of that company in 1932 following the death of H. W. Robinson. He was also active in the affairs of the Globe Grain & Milling Co. as a director for many years.

In San Marino, where he made his home, he was known as the "Father" of the city, having been instrumental in the founding of the city in 1912. He served on the San Marino City Council for 25 years, retiring in 1938, and was chairman of various municipal committees.

Mr. Valentine was a member, and served as vice president, of the Society of California Pioneers; director of the California Institute Associates of the California Institute of Technology; member of the pioneer Petroleum Society of California; and served as chairman of the board of directors of the California Community Foundation.

He served for many years as president of the Bolsa Chica Gun Club, and was a member of the California, Los Angeles Athletic, Pacific Union, Bohemian and Tuna clubs.

He was an ardent deep sea fisherman and an enthusiastic yachtsman. These two diversions, together with trout fishing and duck hunting, were his principal hobbies.

In 1896 Mr. Valentine married Miss Louise Chandler Robinson of Los Angeles. He leaves his widow and five children, Mrs. W. L. Stewart, Jr., Mrs. Otis Buckingham, and William W., Edward R. and Henry W. Valentine, all of Pasadena. Interment was in San Gabriel Cemetery.

J. F. Emerich Dies In San Luis Obispo

J. F. Emerich, oil producer and drilling contractor, died at his ranch in San Luis Obispo County on May 13. Mr. Emerich had a long string of successes in the oil business. He was associated at one time in the co-development of many producing wells in the Wichita Falls area of Texas with Joe Danzinger of the Danzinger Oil and Refining Co. Mr. Emerich had drilled many wildcats wells including those in Midway-Sunset, Mendocino, Atascadero, Devils Den and other places in California. Mr. Emerich completed over 200 producing wells in which he had interest.

Mr. Emerich and R. S. Miesse, of Los Angeles, were partners in several producing wells in Devils Den and also in the development of properties in Kings County.

Petroleum Refiners and Rubber Situation

When a few years ago a lot of little men in an island empire in the Far East were putting their heads together and devoting their dubious talents to planning the future of their nation, in this country other groups of earnest men were to be found in equally serious conferences planning for the future. In the one case the planners were bent on destruction and conquest. In this country the planners sought to construct against a future when what they planned might serve their country and its people.

Little did the Americans realize that the very things upon which they were working might in the not too distant day be related to the events which were subsequently to be a direct result of the plans of the men of Nippon. Our men were petroleum technologists, research scientists, pioneers in a new field, working to develop a substitute for rubber. Japan's men were military and naval experts seeking to conquer the countries which supplied the United States with 95 per cent of the crude rubber it used.

When Japan gobbled up Indo-China, conquered Malaya and overran the Dutch East Indies, the American public immediately centered its attention on rubber, a vital raw material which until then it had taken pretty much for granted. Only then did the public begin to realize that our own technologists had for many years been far ahead of it so far as synthetic rubbers were concerned. They had been interested in this subject for many years, for which this country and its people may be everlastingly grateful.

The recent barrage of publicity on synthetic rubber has left the public rather badly confused. Actually the synthetic rubber picture is not hard to put together and once it has been assembled two very pertinent facts stand out in bold relief: We know how to make synthetic rubbers and we are making and have been making them.

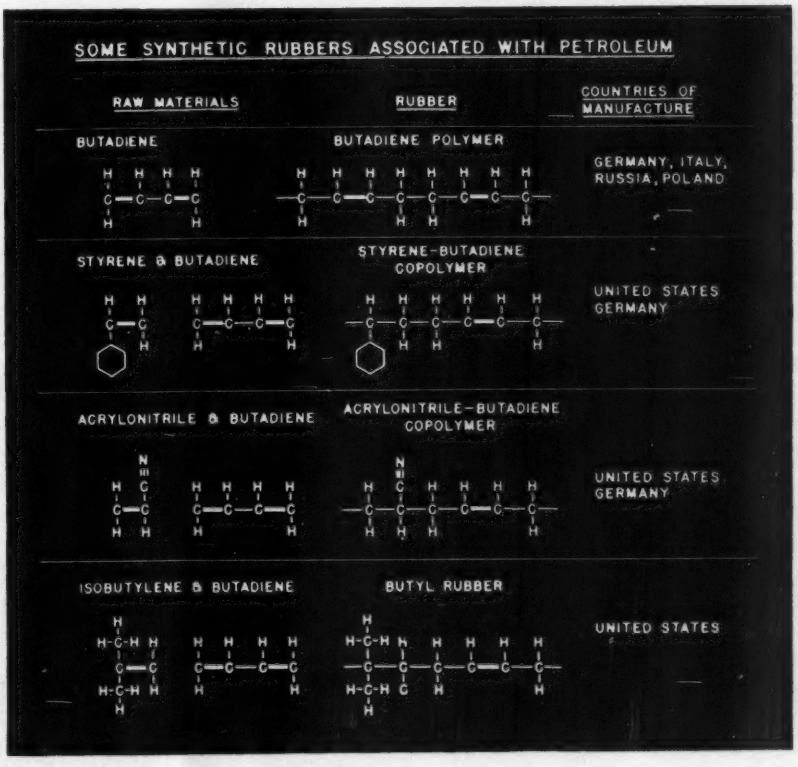
We know how to do so because we are an ingenious nation, not content to depend entirely on what nature has given us, but ever trying to improve upon the many natural products we use. Moreover, our industrialists plan not from one election to another, but for years to come. They are accustomed to looking far ahead.

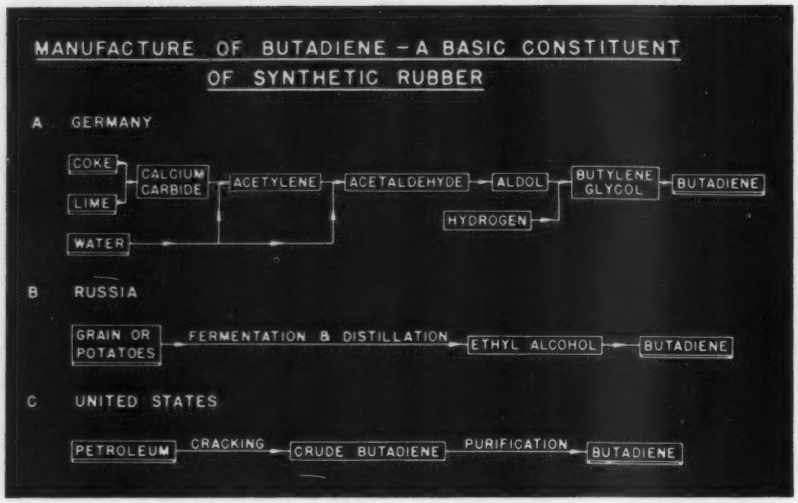
It was as a consequence of this foresight that the officials of the Standard Oil (N. J.) back in 1927 went to Germany to investigate the amazing work that country was doing in synthetic chemistry. So impressed were these far-seeing officials that two years later they consummated a deal with the German I. G. Farbenindustrie that gave our country some processes which are today so valuable that many informed persons believe we could not win the war without them.

The Standard Oil Company (N. J.) brought back the hydrogenation process, which enables this country to plan ahead to the day when we may have depleted our oil reserves and will be forced to obtain oil from coal. Its agreement gave us a process for making 100-octane gasoline, the germ of a method for making synthetic toluol and it provided us with two different kinds of synthetic rubber, Buna-S and Buna-N.

Today these products are vitally important to this rubber-less nation. Add to them Butyl rubber, which the Standard's own chemists developed and which today may be our civilian population's chief hope for rubber for tires.

Synthetic rubbers came into being in the United States because our technologists and the industrialists with whom they are associated had vision and courage plus a pioneering instinct which is a characteristic of American industry. They owe their being, too, to the fact that we were seeking synthetic products which possessed characteristics lack-





ing in natural rubber, such as the ability to resist heat, high voltages and the action of hydrocarbon solvents and oils. All of the chemical rubbers we produce today are made with the aid of hydrocarbon gases, such as butadiene, isobutylene, acetylene or ethylene. These gases may be produced from petroleum, coal or even vegetable matter, as is done today in Russia.

The Buna rubbers are probably of more significance today than their companions among synthetics. They were first made in Germany. They are made by combining butadiene with other substances. Basically Buna-S, which is the most promising synthetic rubber for automobile tires, is butadiene and styrene. Buna-N sold by Standard Oil Company (N. J.) under the trademark as Perbunan, which has a number of specialty uses, is butadiene and acrylic nitrile. In making Buna the butadiene is polymerized with the styrene or the acrylic nitrile, the resulting emulsion is drawn off, mixed with acetic acid or other chemicals to coagulate the rubber, which is then washed, dried and treated like natural rubber.

The Buna rubbers are highly resistant to heat, abrasion, the aging action of sunlight and air, and the Buna-N type to the action of hydrocarbon solvents and oils. They can be vulcanized by sulphur and worked by the same machines used for natural rubber.

Buna-S promises to play an important part in equipping our military machine when our country's 650,000-ton stockpile of natural rubber has been depleted, or in making this stockpile last longer.

Perbunan (Buna-N) while not ordinarily used for tires, has many uses in industry. It also can be vulcanized and worked in standard rubber equipment. Unlike natural rubber, it resists gasoline, oil and many organic solvents. It is ideal for practically all types of gaskets, oil hose and fuel lines, particularly on planes and automotive equipment and will have many uses in our military machine. In addition Perbunan will serve a wide variety of useful industrial purposes for which natural rubber was formerly employed.

The outstanding properties of this synthetic are its excellent resistance to swelling and deterioration in aliphatic hydrocarbons, mineral oils, animal oils and fats, its excellent aging properties, good heat and fatigue resistance and high tensile strength when re-enforced with carbon black.

Of all the synthetics today the general public and particularly the motorists are most interested in Butyl rubber. As matters stand today all the Buna-S we can produce in the immediate future must be devoted to our military needs. But, if we can build plants to manufacture additional Butyl rubber there is some chance that some of this production may be used to make tires for urgent civilian needs.

Butyl rubber is an American development, first made by the scientists of the Standard Oil Company (N. J.). Its qualities are many. It has excellent electrical properties for insulated wire and cable. It has low water absorption. It will resist oxygen, ozone and aging, strong acids and oxidizing chemicals. Its vibration absorption properties are good. It swells in hydrocarbons about like rubber. It offers excellent resistance to mustard gas and has very low permeability to air, hydrogen, helium, carbon dioxide and other gases and good resistance to flexure at both low and high temperatures.

This promising American-made synthetic rubber is produced entirely from hydrocarbon gases. A co-polymer of an olefin and a diolefin, it is a combination most chemists considered impossible to convert into rubber. It is the first chemically stable soft rubber. It has already been used to manufacture such products as tobacco pouches, floor mats, rubber tubing, rubber hose, insulation and many military articles. Moreover, Butyl rubber tires will give as much as 10,000 miles of service at speeds of less than thirty-five miles an hour.

We have today the necessary raw materials to manufacture all the Butyl rubber we need. We lack the plants. A Butyl rubber plant costs to construct approximately $700 per annual ton of capacity as against a cost of about $1,000 per annual ton of capacity for a Buna rubber plant. If we can get the steel and other materials we can build the plants. If large-scale production is sought the Government can not expect private industry to erect the plants without a subsidy.

In any long-range look at the rubber problem Butyl looms large. It seems at this time destined to play an important part in solving many of our rubber problems.

These are by no means all the synthetic rubbers we know how to make today. The E. I. DuPont de Nemours and Company chemists have long experimented with synthetic rubbers and have a synthetic rubber known as Neoprene. This is produced by polymerizing acetylene in the presence of a catalyst to form another chemical known as mono-vinyl-acetylene. When hydrochloric acid is added to this it produces another chemical which, when polymerized, becomes Neoprene. This product finds a wide use in beltings, gaskets, molded goods, gasoline and other hose and is mixed with other compounds and processed by methods similar to those used for natural rubber. Current difficulties in securing chlorine lessens its availability at this time.

A synthetic product known as Thiokol is identical to one known as Perduren made in Germany. This is made by combining the hydrocarbon gas ethylene with chlorine from ordinary salt to produce a liquid ethylene dichloride. From salt and sulphur, sodium polysulfide is produced. The two chemicals are mixed in large vats in the presence of a catalyst to form a gummy mass. This is water-washed free of the excess polysulfide and sodium chloride. Acid is then introduced into the washed deposit causing it to coagulate into a rubber mass, Thiokol. This is then sent to a cracker mill which removes moisture and shreds the material. A second mill refines it, forms it into sheets similar in appearance to sheets of crude natural rubber.

These synthetic rubbers are among the outstanding and most promising products today. In addition, there are a group of synthesized resins chemically treated to become rubber-like products when treated with softeners. Among these are Koroseal, made by Goodrich Tire and Rubber Co., Flamenol, made by General Electric Company and Vinylite, made by Carbide and Carbon Chemical Company. These chemical rubbers have high elasticity, resistance to water, sunlight, oxidation and most oils and are made as liquids, semi-plastics and hard solids. They are used for electric wire insulation, gaskets, molds for plaster casts and many other purposes.

Just what other synthetics are now in the laboratory stage no one knows. Doubtless American chemists in many fields are hard at work endeavoring to develop additional synthetic rubbers.

So far our synthetic rubber industry has made substantial progress, particularly so when one considers that we felt reasonably sure of our rubber supply from the Far East and synthetic rubbers until quite recently had to compete with the much cheaper natural product. It is to our credit that today we are producing some 25,000 tons annually of rubber from petroleum for specialty uses. Germany's synthetic production was at about this rate when war broke out.

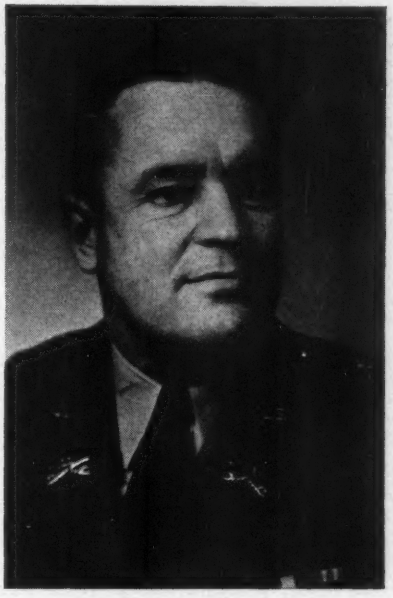
It would be a rash prophet who would dare to predict at this time the future of synthetic rubbers in the United States. One thing is reasonably certain: The synthetic rubbers have come to stay. When our forces conquer the Japanese and when once again crude rubber is loaded at Singapore or Java or Rangoon and sent across the seas to this country, we will still be using the synthetic products.

Today many of the synthetic products are better suited for use in many industries than is natural rubber. As time goes on new uses will be found for these synthetic rubbers. We will doubtless find that many industries which never used rubber, because it was adversely affected by oil or gasoline, for example, will tomorrow use synthetic products.

Horrible as is war, every war has benefitted the world by bringing forth new products for use in peacetime. This war may well give us a synthetic rubber industry which in peace-time to follow will grow in importance and make contributions to our new economy, give us new products and add new features to existing products of many kinds.

Army Air Force Moves To Protect Oil Plants

The Army Air Forces, Materiel Center, Western Procurement District, has established a Petroleum Unit for Plant Protection of Oil



Maj. Verne Austin

Industry Facilities. Offices have been opened in the Subway Terminal Building in rooms 1021-23-25 and at 26 O'Farrell Street, San Francisco. These offices will be staffed with technically trained men under the direction of Major Verne Austin, Air Corps. Major Austin is well known to California oil men through his former connection with the State Division of Oil and Gas as a Petroleum Engineer. He is a member of the American Institute of Mining and Metallurgical Engineers and the American Petroleum Institute. He is also a graduate of the Army Industrial College, Washington, D. C. and was working on oil problems in the Office of the Under Secretary of War prior to his transfer to the Army Air Forces to deal with those matters having to do with petroleum.

Heat Exchangers and Cooling Towers

in Compressor Plant Installations

By
W. E. Dunn and Hugh R. Lamberth
The Fluor Corp., Ltd.
Los Angeles, Calif.

Presented before
A. P. I. Division of Production

ABSTRACT

The use of heat exchangers and cooling towers in compressor plants generally covers engine and compressor jacket water, lubricating oil, and gas cooling.

Cooling systems are classified as (1) open circulation systems, which include (a) raw water systems, (b) recirculating systems employing either open ponds, spray ponds, spray towers, atmospheric or mechanical draft towers or (2) closed circulation systems in which the substance to be cooled is passed through heat exchanger equipment and there cooled by water, air, or other medium.

Atmospheric deck towers are the most acceptable for compressor plants, having high efficiency, flexibility, high capacity, and economy. Mechanical-draft towers have higher first costs but are compact, efficient and independent of natural air movement.

The heat exchangers for closed systems are of three types (1) pipe coils, (2) open or atmospheric cooling sections and (3) closed or shell and tube exchangers. Of these the open type is most generally used in compressor plants, depending on good water distribution and air movement.

The paper is accompanied by characteristic flow diagrams for open and closed jacket water systems, and by graphs giving the approximate cost per compressor horsepower of open and closed systems for different rates of water circulation. Other graphs give pumping horsepower requirements of open and closed systems for different rates of water circulation.

The normal application of heat exchangers and cooling towers in a compressor plant covers engine and compressor jacket water, lubricating oil, and gas cooling.

Jacket water cooling in particular has been subject to a wide divergence of opinion as to what constituted good operating practice. Recognized usage as to engine temperatures and quantity of water to be circulated has in recent years been confined to reasonable narrow limits. The fundamental problem is the same for any two like engines, regardless of location, and specifications setting forth operating conditions to be met should be carefully considered before any cooling equipment is purchased.

H. R. Lamberth

W. E. Dunn

There are two distinct parts to setting up cooling requirements,

(1) Determination by the operator of the exact engine operating conditions desired. Good practice falls within a close range of variation which should be determined from the engine manufacturers' recommendation, the experience of others as well as the operator's own experience. Gas cooling requirements are of course variable from plant to plant but can be accurately determined by the specific job to be done.

(2) Selection of equipment to meet the operating conditions previously determined upon. This often requires some ingenuity. Local conditions of water supply, available space, atmospheric cooling factors and other variables affect the type, size and arrangement of equipment materially. Equipment can and should be selected to meet the operating condition specified. Conversely, engine operating conditions should not be changed, out of the good practice range, to suit the cooling equipment. This latter procedure invites expensive maintenance which will almost certainly offset any gain in first cost or convenience realized by improper application of equipment in the cooling system.

Inasmuch as the jacket water cooling to be accomplished per unit of horsepower permits of reasonably uniform treatment, the equipment necessary to this phase of the cooling problem will be discussed first. Lubricating oil cooling is for the most part integrated with the jacket water system and for simplicity will be so considered in this discussion.

The following outline describes the usually possible water cooling systems that can be employed:

A. Open circulating system.
   1. Cooling water available
      (a) from river, wells, lake, etc.
   2. Recirculating water cooling system necessary.

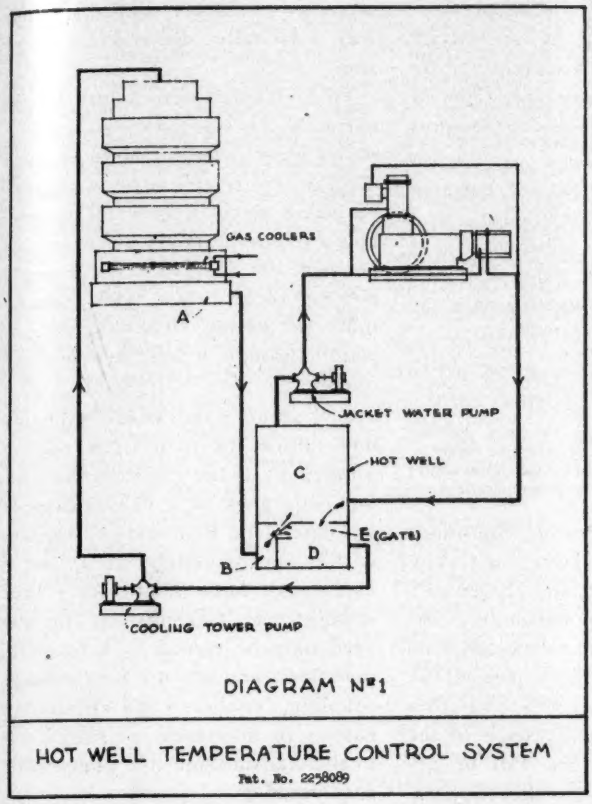


DIAGRAM N°1

HOT WELL TEMPERATURE CONTROL SYSTEM
Pat. No. 2258089

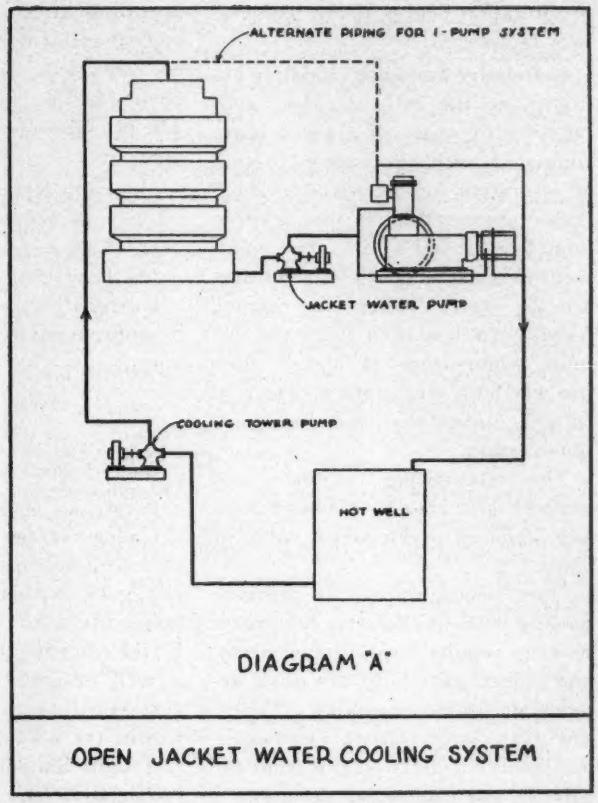


DIAGRAM "A"

OPEN JACKET WATER COOLING SYSTEM

(a) Open pond
(b) Spray pond
(c) Spray tower
(d) Atmospheric deck type tower
(e) Mechanical draft tower

B. Closed circulating system.
1. Raw cooling water available for use with heat exchangers.
2. Recirculating water cooling system necessary as tabulated under A-2-(a) for use in combination with heat exchangers.
3. Air-cooled heat exchangers.
(a) Dry air
(b) Humidified air
(c) Evaporative type

The open system designates the system wherein raw water is circulated through the jackets and then either wasted or cooled evaporatively in an open pond or tower and recirculated.

There are relatively few compressor plant locations convenient to a proper supply of cooling water that can be used once and wasted. Such a supply of water, if available, should

(1) Afford a continuously dependable quantity to keep the jacket temperatures within the good practice range.
(2) Be free at all times from silt, sand, and foreign matter.
(3) Contain a low content of scale forming minerals and have a substantially neutral pH value.

Where a recirculating water cooling system is necessary the open system employing one of the methods outlined in A-2 above represents the lowest first cost in equipment and usually a slightly lower pump horsepower requirement.

The primary psychometric factors influencing any type of atmospheric evaporative water cooling are defined below.

1. **Dry bulb temperature:** Dry bulb temperature is the air temperature as measured by an ordinary thermometer with a dry bulb.

2. **Wet bulb temperature:** Wet bulb temperature is the temperature shown on a thermometer whose bulb is wetted with water and whirled rapidly through the air. It is the temperature at which the sensible inflow of heat to the bulb, due primarily to the higher dry bulb temperature, is balanced by the latent heat outflow from the bulb due to evaporation on its wetted surface. It is the lower theoretical limit of evaporative cooling, and is the reference level on which the performance of cooling towers and similar equipment is predicated. Stationary wet bulb thermometers, unless provided with a rapid flow of air over the bulb, and unless located in the shade and not affected by heat from nearby objects will invariably read higher than the true wet bulb.

3. **Dew point temperature:** Dew point temperature is the temperature at which the water vapor in the air is saturated. The air will absorb no more water vapor unless the temperature is raised and conversely

precipitation begins if the temperature is lowered.

4. **Relative humidity**: Relative humidity is the ratio of the vapor pressure of water in a given space compared with the vapor pressure at saturation for the same dry bulb temperature. Where the relative humidity is 100% the dew point, wet bulb, and dry bulb temperatures are the same. Where the relative humidity is less than 100% the dry bulb temperature is higher than the wet bulb temperature, which in turn is higher than the dew point temperature.

The relationship of these and kindred data may be obtained from any standard psychometric table or chart.

Open ponds, to provide adequate cooling without excessive raw water makeup require large ground areas, and unless quite large are not a dependable source of cooling. Ponds, due to the large water area exposed, are subject to heat pickup from the ground and from solar radiation.

Where spray nozzles, usually operating at 5 to 15 p.s.i. pressure and spraying upwardly, are installed over ponds, the area required for cooling can be considerably reduced. The principal objections to the spray pond are:

(1) High water loss and nuisance of wind blown spray.
(2) Large space required.
(3) Low cooling efficiency.

Evaporative cooling efficiency can be approximately stated as

$$E = \frac{T_1 - T_2}{T_1 - Twb}$$

where:
T_1=temperature of hot water to cooler
T_2=temperature of cold water from cooler
Twb=atmospheric wet bulb temperature
E=efficiency in per cent

Under average normal conditions of 3 to 5-mile per hour wind velocity, good exposure, and at wet bulb temperature of approximately 70° F., the efficiency to be expected from a well designed single-pass spray system will be about 50%. In other words, the cooling approach to the wet bulb temperature will be approximately equal to the temperature range through which the water is cooled. Lower wind velocities will materially decrease performance.

This cooling performance would normally be adequate for cooling jacket water where modern practice dictates relatively large quantities of jacket circulating water to provide a temperature rise in the engine between 10° F. and 20° F. It would not be adequate in older installations circulating small amounts of water through a long temperature range.

The spray pond would probably not suffice for many gas cooling problems. If the gas from the cooling coils goes to a dehydration or gasoline plant, it should be cooled to within approximately 10°F. of a 75°F. wet bulb temperature. For straight gas transmission the gas need only be cooled to a temperature low enough to not damage coupling rubbers and protective paint. A maximum of 95°F. gas to the transmission line is generally considered good practice.

The spray cooler or spray tower

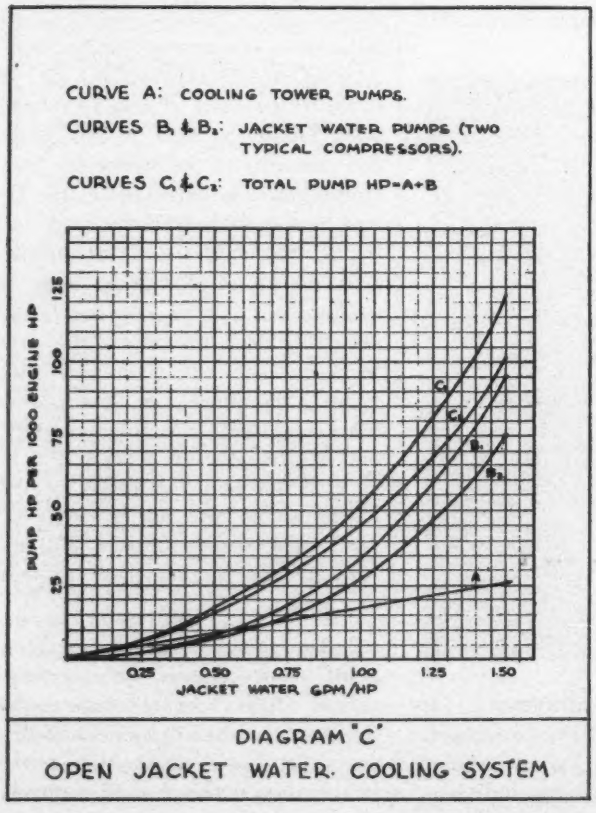


DIAGRAM "C"
OPEN JACKET WATER COOLING SYSTEM

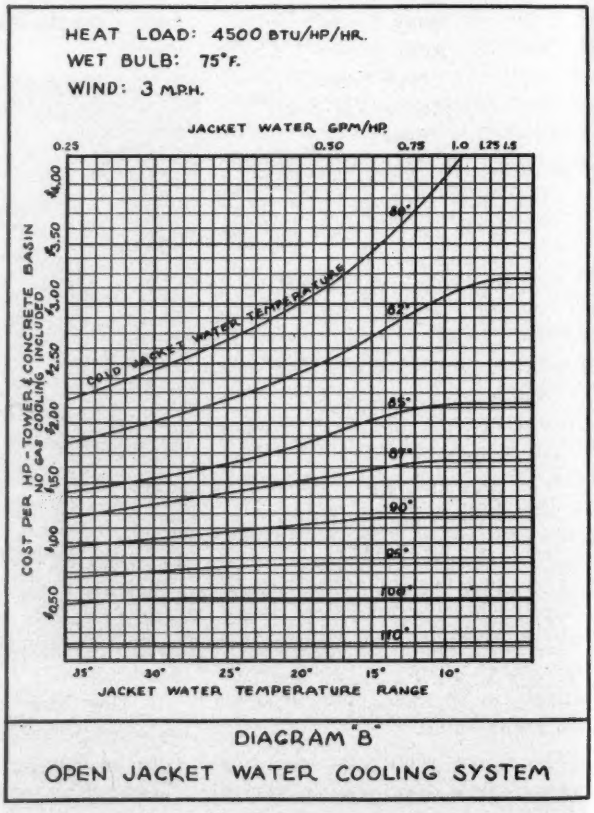


DIAGRAM "B"
OPEN JACKET WATER COOLING SYSTEM

is an improvement over the spray pond but is limited in size to relatively small capacities. This equipment consists of a louver wall structure, containing no decks, with a down spray water distributing system on top of the structure. Nozzle pressures range from 5 to 15 p.s.i.

Effective economical width of the spray cooler is approximately 12 feet and the height will vary from 10′ to 20′ depending upon the service. The capacity, depending upon the service, will range from 1.0 to 2.0 gallons of water per minute per square foot of ground area. Under good operating conditions the maximum efficiency to be expected is approximately 65%.

The advantages of the spray cooler are:

(1) Simple structure and low first cost.

(2) Higher efficiency than open pond or spray pond.

(3) Better performance under extremely low wind condition due to down circulation of air induced by the high pressure sprays within the wall structure.

The disadvantages are:

(1) Limited cooling efficiency.

(2) Relatively low capacity per unit ground area and per pump horsepower.

(3) Water spray loss.

The atmospheric deck type tower is the generally accepted standard method of water cooling in compressor plants. Film type water surface exposure, such as provided by decks, is necessary where cooling efficiency in excess of 65% are desired and where high cooling capacity per square foot of ground area is essential. The deck type tower is flexible through a wide design ratio of temperature drop to approach. Economical maximum cooling efficiency ranges between 75% and 85%. Cooling efficiencies of 90% plus can be obtained under good conditions.

Effective deck width is usually limited to 12 feet, with heights varying from 25 feet to 50 feet. The minimum concentration for best performance is about 1.0 gallon per minute per square foot. Below this concentration it is difficult to insure uniform breakup and distribution from deck to deck. The maximum concentration for best performance is about 3.5 gallons per minute per square foot. Above this concentration the falling water presents sufficient curtain effect to retard the proper flow of air through the tower from side to side.

Water spray loss can be reduced to a very low percentage of the total circulation without affecting performance adversely. Where space and good exposure are available, deck type towers are flexible and economical, both in first cost and operating cost.

All natural draft cooling towers or evaporative water cooling apparatus are dependent upon and sensitive to wind velocity. If, for instance, a tower is designed on the basis of a 5.0 mile per hour wind velocity it need be only 80% as long as the same type tower designed for the same performance with a 3.0 mile per hour wind.

Mechanical draft towers have been installed in only a few compressor plants, however this type of tower is becoming more popular and is now being applied to water cooling problems on an increasingly large scale. The development of the modern propeller type, multi-blade, variable blade-pitch fan which efficiently moves large volumes of air against the relatively low back pressure required in mechanical draft towers has, probably more than any other one factor, brought this type of tower within the economic scope of general cooling problems.

The conventional mechanical draft tower consists of a frame sheathed with solid tongue and groove lumber to provide an air-tight and water-tight chamber. Such towers are of the spray filled or deck filled type The spray filled type contains no deck or grid surface, but depends on spray nozzle distribution alone for water breakup and cooling exposure. The efficiency of this type is not over 65% and hence not applicable where close approach to the wet bulb is desired.

The deck filled towers are fitted with closely spaced grids to an effective height of 10 ft. to 15 ft. Water is distributed over the deck surface with spray nozzles or flume type distributors, and air is forced or induced upwardly through the decks to secure a highly effective contact of air and water across the film surfaces.

Mechanical draft towers may be loaded to concentrations up to 6 GPM per square foot, although the average problem seems to fall between 1.5 and 3.0 GPM per square ft.

Cooling efficiency, as in the atmospheric tower, is economical in the 75% to 85% bracket and can be designed to 90% plus if necessary.

Spray loss will range from 0.1 to 0.2 of 1% of the circulation, which makes this type of tower the most economical from the standpoint of water loss.

The induced draft type, where the fan is mounted horizontally on top of the tower and pulls air upwardly through the tower, is the type in most general demand now. The induced draft type (1) is more compact than the forced draft tower, (2) fan blades do not tend to ice up in the winter months, as the fan operates in the warm exhaust air stream, and (3) the biggest advantage is that it greatly reduces the tendency to recycle hot saturated air, inasmuch as the exhaust leaves the fan at a velocity of approximately 1800 feet per minute. In the forced draft tower the air leaves the top of the tower at a velocity of approximately 350 feet per minute, and this low velocity is not always sufficient to carry the saturated air free of the tower, especially when a cross wind is blowing.

In general the operating horsepower required for fans and water pumping will be approximately

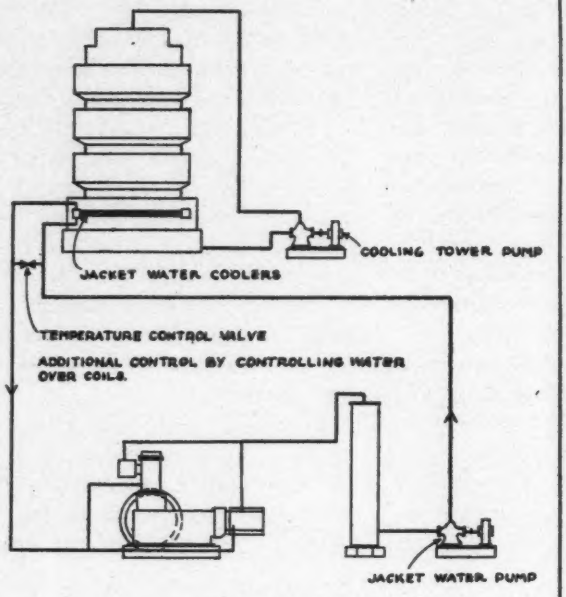


DIAGRAM "X"

CLOSED JACKET WATER COOLING SYSTEM

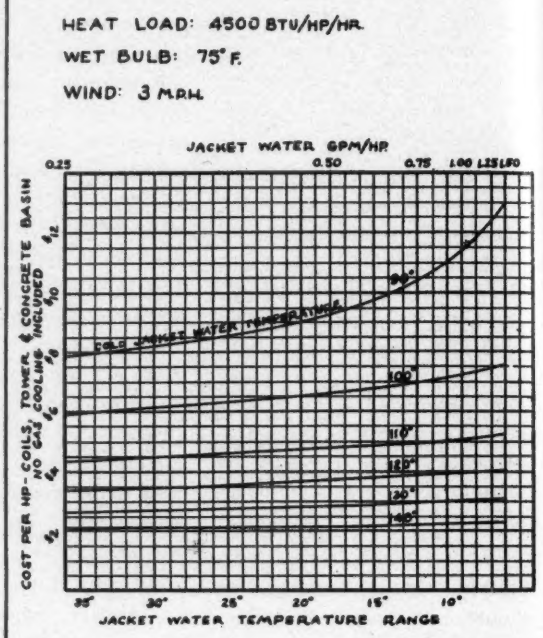


DIAGRAM "Y"

CLOSED JACKET WATER COOLING SYSTEM

double that required for water pumping over a deck type tower.

Mechanical draft towers are higher in first cost and operating cost but have the following fundamental advantages:

(1) Compact — small space requirement.

(2) Performance is not dependent on natural air movement.

(3) Low pumping head.

(4) Low spray loss or carry-over.

The closed circulating water system designates the system where circulating water used in the jackets is cooled in heat exchangers by an outside source of cool water or air, thus allowing the circulating water system to be kept clean and free from scale.

Heat exchangers used in compressor plant work, and installed in conjunction with a source of cold water as described above are of three general types.

(1) Pipe coils.

(2) Open or atmospheric type cooling sections.

(3) Closed or shell and tube type exchangers.

Pipe coils are simple and probably were about the first type of coolers used in compressor plants. As there has never been any commercially standardized design, most pipe coils have been home made, not always installed efficiently, and as they were for the most part steel pipe or tubing, life has not been satisfactory. When life and performance are evaluated, fabricated cooling sections are obtainable for about the same first cost. The arrangement of pipe coils is usually neither compact nor conveniently accessible for inspection and maintenance. The use of pipe coils has been generally discarded.

The open or atmospheric type of cooling section is probably the most widely used type of heat exchanger installed in compressor plants for gas cooling and for jacket water cooling where the closed system is used. This type consists usually of 1" O.D. Admiralty metal tubes, 10 feet to 20 feet long, roller expanded into cast iron or cast steel headers at each end. Headers and tubes are properly supported and stiffened so that the whole unit makes a flat, compact coil usually installed horizontally under sprays or in the base of a cooling tower. Open sections of this type are obtainable in a variety of standard sizes, passes, and working pressures and are readily adaptable to, and flexible in, practically any type of cooling system.

Open sections should be installed in an open location and well exposed to natural air currents or ventilation. Sections which are submerged under water, such as in a pond or basin, do not have the efficiency that sections installed in the open have. This is due to the reduced heat transfer rate on the outside of tubes when submerged. They are also more difficult to inspect and clean when submerged.

Where sections are arranged in the open and not exposed to free ventilation, the hot saturated air surrounding the coils, due to evapora-

tion, will tend to reduce the heat transfer rate and lower the efficiency. This is especially true in a cooling tower which is not designed specifically for use with coils.

Water circulation over open sections, both in quantity and uniformity of distribution over the tube surface is most important. The tendency in most plants is to circulate insufficient water, The design performance is based on all of the cooling water striking the tube surfaces uniformly. If part of the water misses the tubes, as will no doubt happen, less water goes on tubes which (1) reduces the effective total surface in use, (2) encourages scale formation, with reduced efficiency and higher maintenance, (3) requires the remaining water to work through a longer temperature range, which in turn encourages evaporation of water on the tube surfaces with its blanketing effect. (4) If cast iron headers are not wetted uniformly they will be alternately wet and dry which promotes rapid corrosion, and tends to cause failure of the headers far ahead of the normal tube life.

Distribution of water under high pressure spray nozzles, such as in a spray cooler, is more finely and uniformly divided and strikes the tube surfaces with velocity which promotes higher transfer rates and reduced scaling. Gravity, low head sprinkler distribution is more difficult to perfect, making it desirable to increase the water flow slightly to insure good coverage.

In any compressor plant installation of open cooling sections the water circulation over the coils should not be less than 1.5 to 2.0 gallons per minute per square foot of projected tube area in the horizontal plane. Even more water is desirable from a practical operating angle.

Discharge gas cooling coils should be rigidly supported and where coils are in a tower they should preferably be supported on separate concrete piers and not supported on, or attached to, the tower structure on account of vibration due to pulsating gas supply.

The closed or shell and tube type gas or water cooler finds less preferred application in compressor plants due primarily to higher first cost and increased maintenance cost. Inasmuch as the fluids on both the tube side and the shell side are at relative high velocities, heat transfer rates are good, and the final size selection is compact and usually easy to place in a convenient location.

Gas coolers should be designed with the gas passing through the shell, and the water passing countercurrently through the tubes. The tubes are relatively small diameter ⅝" O.D. or ¾" O.D. and, if the quality of water is not good, frequent de-scaling and cleaning is necessary. Cross baffles in the shells of gas coolers have given trouble in some designs. Cross baffles are necessary to control the gas velocity and hence have a considerable effect on the overall heat transfer rate. When cooling gas on the compressor discharge, vibration will set up in the tubes and baffles which may, depending upon the design, (1) cut the tubes through, or (2) turn back the edges of the baffle orifices, which affects performance. Where a comparatively thick, tight baffle is used, vibration difficulties are kept to minimum but with the disadvantage that tubes will be hard to remove if that ever becomes necessary.

There is available now a shell and tube type gas cooler with longitudinally finned tubes. The addition of this secondary or fin surface allows a reduction of primary surface or number of tubes. In some cases the number of tubes for a given capacity can be reduced by more than 70%. This allows a high water velocity through the reduced number of tubes, which reduces the tendency for mud, silt or scale to deposit. These coolers are built in standard sizes, for small compressor capacities up to 500 p.s.i. Parallel installation can be installed for any given total capacity.

It should be borne in mind when comparing open sections and shell and tube coolers that closed coolers are more difficult to service and require more machine shop facilities, handling, and skilled labor for maintenance.

Under present conditions open sections can be more readily obtained as shell and tube coolers require more critical material in the shell construction and more than twice the amount of man and machine hours to produce equivalent cooling capacity.

In any combination of towers and coolers, adequate jacket water temperature control is essential, and especially so in the winter months.

Pumps, piping, valves and other accessory equipment should be installed to allow pumping a continuous supply of water through the jackets with about an average 15°F. temperature range. When warmer engine temperatures are desired, this should be controlled by varying the inlet water temperature, and not by reducing the water flow. If the engine outlet temperature instead of the inlet water temperature is controlled, the results will be a reduction of circulation and an increased temperature rise through the engine in winter months, which on practically all gas transmission lines are the months of heaviest load. This is dangerous practice which often leads to serious mechanical damage due to poor lubrication, irregular cooling of the jackets due to low velocity water flow and excessive expansion strains due to too wide temperature differentials.

Where a cooling tower is used, a winter distributing system located near the bottom of the tower will provide less water exposure in the tower and hence less cooling. Even this might not be sufficiently effective in very cold weather.

A water by-pass from the jacket discharge to the pump suction can be used. This will adequately control jacket temperatures but has the disadvantage of robbing the system beyond the by-pass of an adequate

Two Big Reasons Why WAR *makes this the*

FOR YOU — 3 TIMES FASTER COOLING TOWER DELIVERY

FOR THE NATION — COUNTLESS MAN-HOURS AND TONS OF CRITICAL MATERIALS SAVED

A Statement of Fact Concerning Cooling Towers Made as a Contribution to Increasing War Production in Your Plant and to Benefit the Nation's War Effort. This is Why Atmospheric Cooling Towers Should Be Specified Today!

FLUOR manufactures Mechanical Draft *and* Aerator Atmospheric Type Cooling Towers. We hold no brief for *either* type, recognizing only the fact that each has its own well-defined field of application. Full recognition of these well-defined fields is *vital to Victory!* In this interest, these facts are published.

In recent years, a pronounced and largely "fashionable" trend has developed toward Mechanical Draft Cooling Towers. Demonstrable facts adequately support the statement that *in approximately 75% of the cases where Mechanical Draft types are being installed, Atmospheric Cooling Towers will render identical service with identical thermal efficiencies!* Beyond pointing out these facts, Fluor previously held no brief against this trend, but this is *WAR!* The saving of critical materials, man-hours, machine-hours, power and energy are now definite deposits to the account of Victory!

Read carefully the comparative table of savings on the opposite page. When Atmospheric Cooling Towers are specified, in the cases where they are the *correct* rather than the "fashionable" specification, tons of strategic materials will be released for offensive War. You will save a large percentage of the prime labor required for assembly of your tower, as well as secondary labor used in the manufacture of fans, gears, motors, switches, flexible couplings and electric wiring in addition to the materials from which they are made. In tower operation, you will save and conserve electric power. The sum total of the material, man-hours, machine-hours, power and energy saved constitutes a substantial contribution to the offensive War effort—*without the slightest concession in Cooling Tower efficiency!*

When to Specify Atmospheric Cooling Towers

This is the rule for *correct* rather than "fashionable" Cooling Tower specification: *Atmospheric Cooling Towers should be specified in all instances excepting those where restricted space or subnormal wind conditions make the use of Mechanical Draft types imperative!* Our engineers will assist, basing their recommendations not on bias but on fact with tower efficiency as the sole objective.

Why Fluor Atmospheric Deliveries Are Three Times Faster

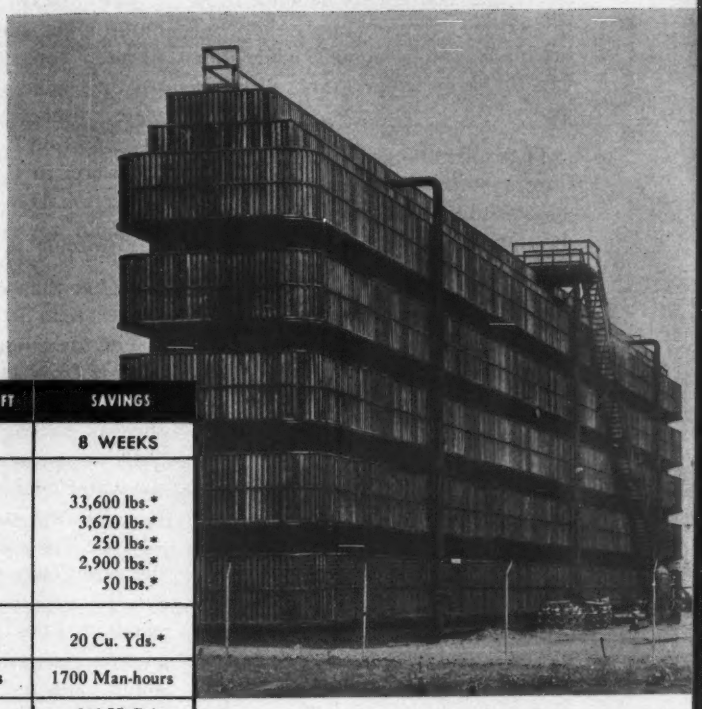
Delivery of Fluor Atmospheric Cooling Towers is three times faster! In the majority of instances, Fluor today is delivering Aerator Atmospheric Cooling Towers ready for fast erection *before our customers have completed foundation basins!* This is due not only to the fact that there is no delay waiting for fans, gears, motors, etc. It is due to Fluor standardization of Cooling Tower Design which makes 100% prefabrication possible. Only Fluor completely prefabricates in a mill with lumber flowing constantly down a production line to finished section storage and thence direct to you. There is no lost time; no waste motion. Your order is filled promptly direct from prefabricated Cooling Tower Section stocks.

For speed in erection, Fluor-trained erection crews are maintained near your plant. Upon completion of the basin, they are ready to swing into action and your tower is in operation in the shortest possible time—another advantage of Fluor prefabrication and standardization. Before you specify a Cooling Tower, consult our engineers and—*Be Sure With Fluor!*

These views show Prefabrication in our Mill, a Portion of Prefabricated Stock ready for Shipment from Storage and Shipment of Fluor Aerator Atmospheric Cooling Towers by Rail and Truck direct from Stock for Fast Field Erection by Fluor-Trained Crews Stationed in all parts of the Country.

FLUOR

Day of the Atmospheric Cooling Tower . . .



Here Are the Figures (Towers of Identical Capacity)

Here is the parallel showing the important savings gained by Specification of Fluor Atmospheric Cooling Towers. This tabulation is for Cooling Towers of identical capacities, in this instance 10,000 G.P.M. Savings for larger or smaller Atmospheric Cooling Towers are proportionate.

ITEM	ATMOSPHERIC	MECHANICAL DRAFT	SAVINGS
DELIVERY	4 WEEKS	12 WEEKS	8 WEEKS
Critical Materials:			
1. Steel	None	33,600 lbs.	33,600 lbs.*
2. Fan Material	None	3,670 lbs.	3,670 lbs.*
3. Bakelite	None	250 lbs.	250 lbs.*
4. Brass	7,750 lbs.	10,650 lbs.	2,900 lbs.*
5. Cast Iron	19,550 lbs.	19,600 lbs.	50 lbs.*
Concrete and Steel Reinforcing for Basin	110 Cu. Yds.	130 Cu. Yds.	20 Cu. Yds.*
Erection Man-hours	3300 Man-hours	5000 Man-hours	1700 Man-hours
Total Fan Horsepower	None	240 H. P.	240 H. P.*
Electric Motors	None	7 or more	7 or more*
Electric Switches	None	8 or more	8 or more*
Reduction Gears	None	7 or more	7 or more*
Electric Wiring	None	As required	100%*
Conduit	None	As required	100%*
Fans	None	7 or more	7 or more*
Flexible Couplings	None	14 or more	14 or more*
Fan Guards	None	7 or more	7 or more*
Fan Supports	None	7 or more	7 or more*
Steel Fan Rings	None	7 or more	7 or more*
Electric Power	Pumping	Pumping Plus Fans	50%

**Also saved are man and machine hours in producing raw materials, fabricating and assembling this equipment.*

Before you specify any type of Cooling Tower, you are entitled to the benefit of our experience. Our engineers will be glad to consider your specific requirements and conditions as the basis for calculations, design and cost. Because Fluor manufactures both Aerator Atmospheric Type and Mechanical Draft Types, Fluor recommendations are made without bias or prejudice as to type. Your continued and complete satisfaction is the prime objective.

FLUOR AERATOR FEATURE MINIMIZES WIND-BLOWN SPRAY

Due to the exclusive, patented Fluor Aerator feature, water loss due to windage is comparable with that of the best designed Mechanical Draft Types. The Aerator feature consists of two or more baffles interspersed with battens at right angles. Thus, before leaving the tower, air is forced to change its direction, coming in intimate contact with baffles to deposit water held in suspension thereon.

Fluor Cooling Towers are built of California Redwood—noted for its everlasting durability and resistance to heat, cold and moisture. In every feature—design, dimensions, materials, construction—Fluor is the specification of those who want the best. When considering installation of a Cooling Tower, remember this: A good rule to follow is—*Be Sure With Fluor!*

Get the facts about Fluor Atmospheric Cooling Towers by writing for Bulletin T-337. Your request, mailed today, will bring prompt response.

THE FLUOR CORPORATION LTD.

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COOLING TOWERS

ATMOSPHERIC AERATOR AND MECHANICAL DRAFT TYPES

water circulation. This can permit freezing in the water piping but also if gas coolers are dependent on this same source of supply they will be inadequately cooled when low gas discharge temperatures are most desired.

There is one patented hot well flow system which has been very successfully used and which was developed particularly for use in systems where jacket water is on an open system, and cooled in a tower in which gas cooling coils are installed. The result desired is to keep (1) a steady, continuous flow of warm water through the jackets, and, (2) a flow of colder water over the coils. Referring to Diagram No. 1, you will note that cold water from the cooling tower basin A flows by gravity to the cold section of the hot well.

The flow of cold water from B is proportioned between section C and section D by a swing valve or gate E, which can be manually or automatically set to maintain a constant water temperature in C.

The jacket water circulating pump takes suction from C and delivers a constant amount of water to the jackets. The hot jacket water discharge flows back to the same section C. Any excess return hot water in C flows by gravity into section D where it mingles with the cold tower water return from section B. The water level in B is higher than in C, which in turn is higher than in D.

The tower circulating pump takes suction from D and delivers it over the cooling tower and hence over the gas cooling coils.

By adjustment of one valve E, (1) the water temperature to the engines is regulated to the desired point, (2) the coldest remaining water is delivered back to the cooling tower, which provides coldest possible water to the gas coils, (3) both pumps run continuously at a constant capacity without the necessity of throttling or by-passing.

Within the last few years there have been installed a number of air-cooled jacket water coolers and a few air-cooled gas coolers. This type of equipment is particularly applicable where water is bad, insufficient, or expensive.

The usual form is to install a forced draft propeller fan to circulate air through finned tubular heat exchanger surface similar to a radiator. The fan can be driven by motor, turbine or gas engine, as convenient. The gas engine drives seems especially adaptable inasmuch as it uses the same fuel as the main plant engines and because fan speed can be readily varied by varying the engine speed to control the final water temperature.

Such equipment should be well designed mechanically to provide long life, and exchangers should be of the finned tube type with cast iron headers rather than the radiator core type, which generally is too light for continuous field duty.

If the fan is installed vertically,

IT HAS EVERYTHING YOU WANTED IN A STARTER

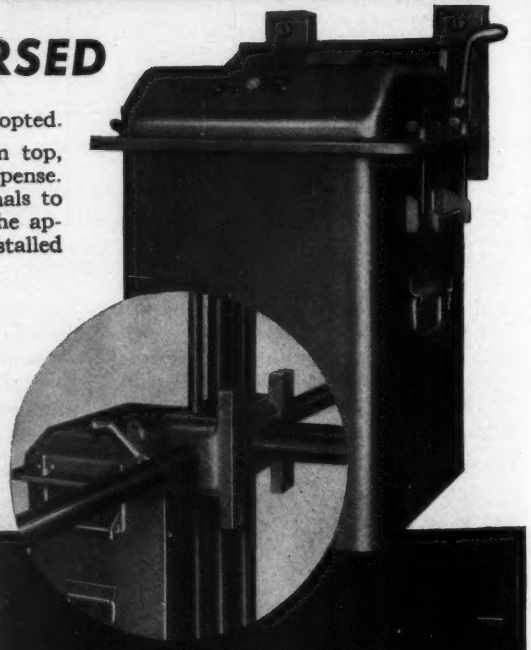
...AND IT'S OIL IMMERSED

We made a survey. Here are some of your suggestions we adopted.

1. Provision for making rigid conduit connections from top, bottom, back, or either side to reduce installation time and expense. 2. Solderless connectors for incoming and outgoing terminals to make wiring easier. 3. Light-color finish which improves the appearance of the starter and keeps it cooler when installed outdoors and exposed to the rays of the sun.

All operating parts—isothermic induction-temperature overload relays, extra-heavy contactor tips, reversible stationary tips—are oil-immersed. Oil-resistant Flamenol wire is used throughout for connections.

Send for Bulletin GEA-3541. General Electric Company, Schenectady, New York.



GENERAL-PURPOSE, LOW-VOLTAGE "COMBINATION" STARTER, CR7008, including a circuit breaker for disconnecting and short-circuit protection. Inset shows conduit entrances from five different directions

GENERAL ELECTRIC

some provision should be made to baffle the down stream side to prevent natural wind currents blowing from the opposite direction from nullifying the fan effect and reducing cooling performance accordingly. Fans can be installed horizontally and blow upwardly through the cooling surface to overcome this objection.

The lower limit of cooling with this type of equipment when circulating dry air is the dry bulb temperature which is usually sufficiently low for jacket water cooling but not for gas cooling. In this connection, it should be pointed out that the dry bulb temperature will vary over a considerably wider range in a normal day than will the wet bulb temperature, and hence make for more variation in the jacket water temperature.

An alternative arrangement of this type of equipment is to wash or cool and humidify the air in a water spray before it enters the fan. This will clean and cool the air, allowing lower jacket water temperatures, but has the disadvantages of requiring a water circulation system, additional equipment, and added fan horsepower.

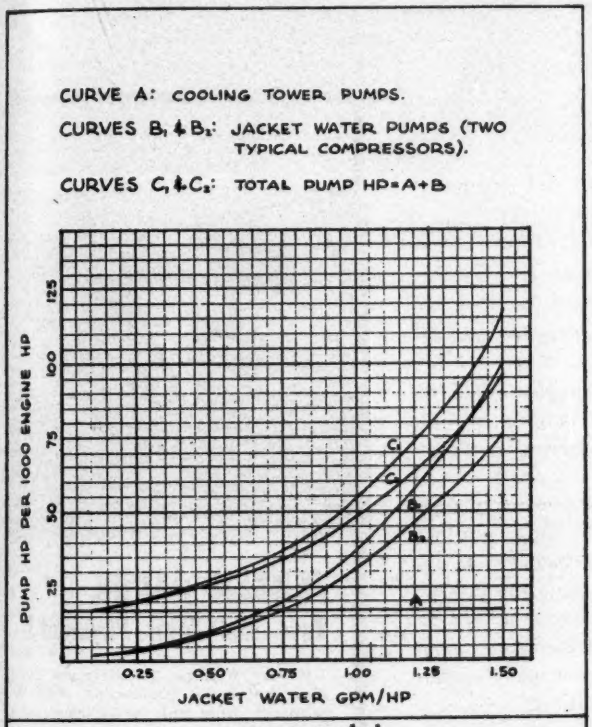


DIAGRAM "Z"

CLOSED JACKET WATER COOLING SYSTEM

It is possible to reduce the air temperature by 50% to 70% of the wet bulb depression in a well designed single-pass spray washer. The air borne moisture is scrubbed out and therefore no water contacts the exchanger surface to form scale.

A third arrangement is to employ the evaporative principle wherein water is sprayed directly on the tubes counter-currently to a stream of air. The wet bulb temperature is the lower limit of cooling in this system. Excellent cooling is obtained while the tubes remain clean. The principal disadvantage to this system is the tendency of the exchanger to scale up rapidly, especially where finned tubes are used. Unless clean soft water is used, maintenance will be a considerable item.

It is possible to use a combination of a primary dry air to dissipate the bulk of the heat, as in a gas cooler for instance, and then use a smaller evaporative secondary cooler in series for final temperature reduction.

In closing, we should like to bring your attention to several self-explanatory charts typifying flow sheets for open and closed cooling water systems together with diagrammatic data showing relative first cost and operating pumping horsepower. These charts are based on the quantity of jacket water circulated in gallons per minute per horsepower. These charts are numbered A, B, and C for the open system and X, Y and Z for the closed system.

Eastman Announces Field Office Managers

Director of Defense Transportation Joseph B. Eastman has announced that managers have been appointed for 16 of the 51 field offices to be established by the Division of Motor Transport. In addition to the administration of the various programs undertaken by the Division of Motor Transport, the field offices will assist the War and Navy Departments and other shippers of war materials in making arrangements for motor transport and will assist in coordinating and mobilizing motor vehicle equipment to meet war requirements. Field representatives will clear emergency motor transport movements with state and local authorities and will maintain liaison with Army and Navy establishments, the Interstate Commerce Commission, and other governmental agencies. W. B. Grummel, formerly vice-president of Pacific Intermountain Express, will be manager of the San Francisco office; Herman Sites, of Portland-Pendleton Motor Freight, will head the Portland, Oregon, office; and Holly I. Smith, Caters Motor Freight System, will manage the Spokane, Washington, office.

Buy Defense Bonds

THIS LAUGH OFF!!

Bartholomew Gillespie tells this one:

"Mammy, who lives in this beautiful home?"

"Kunnel Roberts live here."

"Colonel in which army?"

"He ain't kunnel in no army—he's jes a nachel bawn kunnel."

Fred Dries was telling:

"Have you any children?"

"Yes, six—all in the cemetery."

In due time, the children returned from the cemetery, where they had been sent to play, but it was too late to annul the lease.

Jack Dyer recounts that:

A celebrated lawyer once said that the three most troublesome clients he ever had were a young lady who wanted to be married, a married woman who wanted a divorce, and an old maid who didn't know what she wanted.

Lou Kemnitzer contributes:

A reluctant conscript was asked by the army oculist to read a chart. "What chart?" asked the draftee.

"Just sit down in that chair and I'll show you."

"What chair?" asked the man.

Deferred because of bad eyesight, the draftee went to a nearby movie. When the lights came on, he was horrified to discover the oculist in the next seat.

"Excuse me," said the conscript as calmly as he could, "does this bus go to San Diego?"

Something or other reminded **Bob Philippi** of this story:

A little old lady was being examined by the family doctor, having been sent there by her relatives for what they considered eccentricities.

"I just adore buckwheat cakes, doctor," the little old lady confessed.

"Well, there's nothing wrong about that," the doctor said with a smile. "I love buckwheat cakes myself."

The little old lady beamed. "Oh, you must come over to my house soon. I've got seven trunkfuls!"

Harold Dresser chipped in this one:

Rastus: What all did de doctor say's de matter wid you?

Liza: He says I's sufferin' from acute indiscretion.

Bill Oberlin stopped down to f:256 for this one:

A veterinarian surgeon was instructing a farmer as to a suitable method for administering medicine to a horse.

"Simply place this powder in a gas pipe about two feet long, put one end of the pipe well back in the horse's mouth and blow the powder down his throat."

Shortly thereafter the farmer came running into the veterinary's office in a distressed condition.

"What's the matter?" asked the veterinary.

"I'm dying!" cried the farmer. "The horse blew first!"

Leo Busby tells of entering the office of a local Purchasing Agent at the right moment to get in on this one:

P. A. (on phone) "No, I don't think you are superman. You misunderstood me. I said ship 100 carloads of fertilizer."

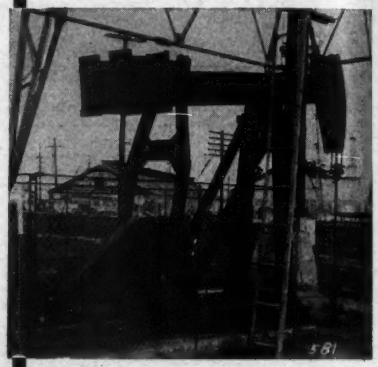
Bill Jarvis heard this one somewhere:

A bishop was more than a little upset to receive on a Friday morning this note from a certain vicar in his diocese:

"My Lord, I regret to inform you of the death of my wife. Can you possibly send me a substitute for the week-end?"

Names used on this page are entirely fictitious, and any resemblance to persons either living or dead is purely coincidental.

JENSEN UNIT (14-DC) on duty near Beaumont, Kansas. Smooth, quiet, dependable. You see 'em everywhere, doing a swell war time job.



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Nomads Observe Foreign Trade Week

Holding the regular monthly dinner meeting during National Foreign Trade Week, the Los Angeles Chapter of Nomads met at the Mayfair Hotel in Los Angeles, May 20. A number of interesting guests were present and the attendance was so large that overflow tables had to be set up. The main speaker of the evening was W. S. Rosecrans, president of W. S. Rosecrans, Inc. and a man long connected with various industries of California, who has travelled in many countries in the interest of foreign trade. Mr. Rosecrans discussed the vital necessity of international trade after the war and during his address pointed out that intelligent, constructive criticism must be carried on now if the kind of peace we all desire is to result from the present conflict.

Awards of Distinguished Service were presented to the regular Nomad members by Emerson Spear in behalf of the Los Angeles Chamber of Commerce which, during Foreign Trade Week, so honored men who had travelled abroad in the interest of foreign trade. These awards were attractive parchment diplomas suitable for framing.

Preceding the main address the several members of the consular service present from a number of foreign countries were introduced by Bart Gillespie. These gentlemen were Dr. Adrian Hartog, consul of the Netherlands; Alastair G. Maitland, vice-consul for the British Empire; Ernesto A. Romero, vice-consul of Mexico; Ismael Aviles, consul of the Dominican Republic; Fernando de Flores, vice-consul of Costa Rica; and Carlos Cavalcanti, secretary to the Venezuelan consulate.

The meeting closed with moving pictures in colors shown by George Sutherlen who took them in Tibet, Nepal and India during a vacation taken when he was with the California Arabian Standard Oil Company in Saudi Arabia.

The foreign oil men present in-

At right, Senhores Luiz Chaves, Affonso Alvim, and Geonisio Barroso, of Brazil. Below, Messrs. Rosecrans, Speer, Measday, and Olafson.

Left, with Bart Gillespie, is Carlos Cavalcanti. Above, the Honorables Alastar Maitland, Fernando Flores, Ernesto A. Romero, Dr. Adrian Hartog, and Ismael Aviles.

cluded M. H. Bush of California Arabian Standard Oil Company from Saudi Arabia; W. C. Field, who was with the N.P.P.M. in Sumatra; Dick Kwakernaat of the Caribbean Petroleum Company, Venezuela; H. J. Buddenhagen of the Shell interests; Maracaibo, Venezuela; Affonso Cesario Alvim, Luiz Meira de V. Chaves and Geonisio Carvalho Barroso of the Conselho de Petroleo, Brazil. Other guests were Walter Measday of the U. S. Department of Commerce; Stanley T. Olafson, manager of Department of Foreign Commerce, Los Angeles Chamber of Commerce; Al Hill of the Los Angeles Chamber of Commerce; and Charles J. Hoffman recently returned from Panama.

Heavy Crude Price Survey

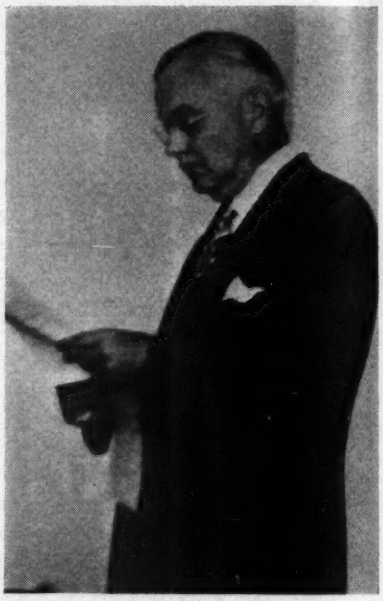
Selection of a committee of 28 companies, to be represented by men of their own choosing, was made at a meeting of a cross section of the oil industry in the Subway Terminal Building May 21, the committee to furnish the Office of Price Administration with data requested by that office for its consideration of prices of California heavy crudes.

W. H. Morgan, of the R. R. Bush Oil Co., was selected as chairman of the group, and presided during the nominations. He will preside over the first meeting of the committee of 28, which is expected to appoint a working sub-committee.

The committee was elected by the operators in four groups of seven each; The so-called major companies; principal minor companies; other independents, and an at-large group, so that all types of operators and all fields are given representation.

Actual personnel of the committee will not be determined until the companies named have selected the man to represent them.

A daily production allotment of 691,900 barrels for June has been assigned the California oil industry by the Office of Petroleum Coordinator, the Production Committee for District No. 5 was advised by wire May 25.



Above, Chairman Morgan; below, heavy oil men in session.

Field Development

Los Angeles Basin

Barnsdall Completes Newhall-Potrero Well

Extending the established limits of Newhall-Potrero approximately 1700 ft. southeast of R.S.F. No. 14, Barnsdall Oil Co. completed No. 31 at the rate of 800 bbls. a day cutting 3.0%. Although the top of the First Zone was not clearly defined due to changes in sedimentation, the top of the Third Zone was identified at 6894 ft. which fits the well into the subsurface picture and shows it to be nearly 200 ft. higher than No. 14. The completion of No. 31 is the first step in connecting the field with C. G. Willis' single producer which is yet a mile farther to the southeast. No. 31 produces several intervals in the Second and Third Zones from 6570 ft. to bottom at 7105 ft.

At the opposite end of the Newhall-Potrero field, The Texas Co. is preparing to drill Newhall No. 1 approximately 1500 ft. northerly from Barnsdall's nearest well. If successful, The Texas well will extend production to a point about a mile from the Del Valle field.

Western Gulf Starts New Oak Canyon Well

Choosing a location approximately 1200 ft. south of the present easterly outpost and highest well yet drilled, Western Gulf Oil Co. is preparing to drill Gilmour-U.S. No. 2 in the southwest quarter of sec. 32, 5n-17w at Oak Canyon. This well will go far towards proving the theory based on development to date that the best portion of the field lies to the south and east of present wells.

Superior Redrills Old Torrance Wells

Superior Oil Co. is following a program of redrilling and reconditioning a number of its old wells at the east end of the Torrance field. Recompleted in the Main Zone, the redrilled wells average from 20 to 40 bbls. daily.

Union to Explore In Chino Region

With the demand still increasing for the heavier oils, Union Oil Co. has turned its attention to the Carbon Canyon-Chino area in the southwest corner of San Bernardino county and is preparing to start a wildcat well on the Newman Bros. property in sec. 2,3s-8w. The location is about a mile northwest of Abacherli No. 1, drilled in 1930 by Western Gulf Oil Co., which produced intermittently over a period of years at rates up to 30 bbls. a day. Several hard tight oil sands were encountered from 1600 to 2600 ft. which yielded small amounts of 23 gravity oil with very little water. Later drilled by Selegna Petroleum Co. and Hillman & Long, the area failed to develop production of any kind and for the last few years has seen no activity of any kind. The Abacherli well was abandoned comparatively recently by Hathaway Co.

In sec. 5,3s-8w, west of the Union site, E. F. Stella has material on the ground to drill McDermott No. 2 near No. 1 which was reported to have found a few showings above 1000 feet.

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Castaic	Mangold & Morse, McDermott	1	26, 5-17	4315	Idle
	Young, Roy, W., Inc., Walker	1	11, 4-16	9546	Drilling
La Mirada	The Texas Co., McNally	A-2	15, 3-11	8680	Drilling
Newhall	Airline Oil Co., Perkins	1	11, 3-16	2610	Idle
Palos Verdes	Surety Holding Co.	1	22, 5-14	1480	Idle
Puente Hills	Continental Oil Co., Turnbull	3	13, 2-11	4362	Drilling
	Lytle, Robt. S., Opr., Central	1	15, 2-11	5180	Drilling
Rio Hondo	Potrero Oil Co., Newman	1	32, 1-11	5430	Testing
San Fernando	Barnsdall Oil Co., T.I.T.	1	30, 3-15	250	Drilling
	Fernando Oils, Ltd., Chatsworth	1	18, 2-16		Rig
	Tide Water Assoc., Sesnon	1	28, 3-16	8912	Drilling
Whittier-La Habra	Los Nietos Valley Oil Co., Woodard	1	29, 2-11	50	Idle
	Orange County				
Anaheim	The Texas Co., Buena Park	1	6, 4-10	5797	Drilling
	The Texas Co., Buena Park	4E-1	36, 3-11	2837	Drilling
Bolsa Chica	La Bolsa Ro. Synd., Crane	1	22, 5-11	7310	Redrilling
Costa Mesa	Thompson, Milton N., Banning	1	9, 6-10	5649	Idle
	San Bernardino County				
Carbon Canyon	Stella, E. F., McDermott	2	5, 3-8		Material
	Union Oil Co., Newman Bros.	1	2, 3-8		Location

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PERFORATIONS?

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Taft: 200 Center St., Ph. 870
Bakersfield: 216 E. Ramona (Riverview)
Ph. Bak. 6-6860

New Del Valle Well Started by Standard

Standard Oil Co. is grading roads over the rough terrain of Del Valle preparatory to drilling a third well on the Sepulveda lease in sec. 17, 4n-17w. Located approximately 990 ft. south and 330 ft. east of the center of the section, No. 3 will be the most easterly of the group of wells forming the westerly portion of the field.

In the easterly Del Valle sector, R. E. Havenstrite, Operator, is plugging the bottom of Barnes No. 1 in order to perforate above 5950 ft. and is getting ready to drill Barnes No. 2.

Formation Unreported In West Coyote Test

No word is being released on formations or showings encountered by Standard Oil Co.'s Murphy-Coyote No. 129 which is coring ahead below 8460 ft. Located in a high position structurally, this well is designed to make a complete test of the deep possibilities of the field. Standard is preparing to drill two more wells on the Murphy-Coyote lease.

Southwest Completes Huntington Beach Well

Southwest Exploration Co. is completing State No. 51, a Huntington Beach Tideland well, with bottom whipstocked beneath the sea to 4968 ft. Eight and five-eighths inch casing was cemented at 4190 ft. and 801 ft. of 6⅝ in. liner including 778 ft. perforated is landed at 4965 ft. While tubing was being run in No. 51, equipment was moved to No. 52 which is now drilling near the 1000-ft. level.

In the Five Points area John Marion is spudding in Fee No. 1 as the most westerly well in the small pool and which, according to preliminary calculations should be the highest on structure. George Duty also plans to spud his first Five Points well soon.

On the flat east of the city Frankley-Harriman, Inc., will soon be under way with Mills No. 1, located to offset the nearly 20 year old production of Standard Oil Co. on the Surf and Gisler leases. A drilling contract is said to have been let to Pike Drilling Co. for the operation.

T. W. A. Completes First Cypress Well

Flowing 2,100,000 cu. ft. of gas with no oil, Tide Water Associated Oil Co. completed Cypress No. 1 at Potrero from gun perforations in the 7 in. casing from 5060 to 5070 ft. This well was the first to be drilled on the Potrero Country Club property more than a dozen years ago but was suspended when the numerous light oil showings could not be made to produce. Cypress No. 2 was then drilled to officially discover the field.

La Mirada Wildcat Passes 8800 ft. Level

The Texas Co.'s La Mirada wildcat, McNally No. A-2 located between Santa Fe Springs and West Coyote, is spot coring below 8811 ft. Although little information is released by the operator, it is understood that formations in the last hundred feet run largely to gray sand with indications of high gas pressure.

Barnsdall Drilling San Fernando Well

Barnsdall Oil Co. is drilling Title Insurance & Trust No. 1 in sec. 30, 3n-15w adjacent to the Los Angeles city water supply reservoir west of San Fernando. The equipment was moved from the recently completed R.S.F. No. 31 at Newhall-Potrero. A joint effort with Seaboard Oil Corp., the well seeks production on the Sylmar Bow east of Aliso Canyon.

West of Aliso Canyon in sec. 28, 3n-16w, Tide Water Associated Oil Co. and Standard Oil Co. are drilling Sesnon No. 1 in shale and hard oil sand below 8915 ft.

Texas Drills Two Buena Park Wells

In an effort to enlarge and outline its discovery southeast of Buena Park, The Texas Co. is drilling two wells on a line with the city of Anaheim with one on either side of the discovery well, Spencer No. 1. Each is considered as a semi-wildcat which can find new productive sands.

Despite the fact that Richfield Oil Corp. failed to execute its lease options in the Santa Ana area, interest still runs high throughout Orange county and a number of new leases have been placed on record.

Bob Cook Resigns To Enter Oil Game

R. M. Cook (Bob to a host of friends) has resigned as vice president of International Cementers, Inc. He is one of the best known men in the oil industry, having traveled extensively in the interests of his company.

Prior to the formation of International Cementers, Inc. he was president of Pacific Cementing Co., whose organization was used as a nucleus around which International Cementers, Inc., built their California operations.

Bob is a partner of Paul Medearis in drilling in Texas, however, he expects to spend most of his time in California.

Miscellaneous Basin Items of Interest

Tide Water Associated Oil Co. is ready to move drilling equipment into the derrick erected for Vickers No. 78 at the north end of Inglewood.

La Bolsa Rancho Oil Syndicate is preparing to redrill after making several unsuccessful tests from 6700 to 7150 ft.

Potrero Oil Co. has recovered only fresh water with oil colors in testing Newman No. 1 north of the east end of Montebello. Last reported trial was of the interval 4670-4690 ft.

CONSIDER THESE IRON BODY VALVES TO SAVE BRONZE

THE "KING-CLIP" — a husky iron body gate valve which employs bronze for the internal working parts only. For many services, the "King-clip" will serve equally as well as a bronze gate valve. Easily taken apart for cleaning. A valve that withstands hard and continuous usage.

THE "FERRENEWO"—an iron body globe valve that may be used instead of bronze valves for many services. All internal parts are made of non-corrodible alloys and are renewable. Seat and disc are regrindable. The "Ferrenewo" will give excellent service with negligible upkeep cost.

Investigate the adaptability of these iron body valves to your needs.

Fig. 1640
"King-clip" Gate Valve
150 lb. S.P.

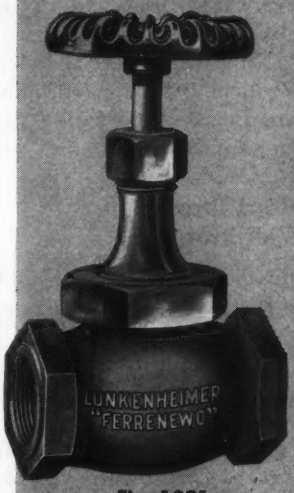

Fig. 1021
"Ferrenewo" Globe Valve
150 lb. S.P.

Since virtually all materials used in the manufacture of valves are on the list of critical materials, valve users are urged to furnish the highest possible preference ratings on their orders. This will be of mutual helpfulness.

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LUNKENHEIMER VALVES

San Joaquin Valley

Richfield Quits Tulare Wildcat

Richfield Oil Corp.'s North Tulare Community No. 1-1 in sec, 33, 19s-24e was abandoned in slate at 5356 ft. after penetrating 9 ft. of the zone. No showings worthy of testing were encountered.

Coordinator Okeys Paloma Resumption

General Petroleum Corporation has received an OK from the Office of Petroleum Coordinator and is preparing to resume drilling Gallagher No. 61-33 in sec 33,31s-26e at the north flank of the Paloma field. The well was suspended at 1816 ft. on its way to the Stevens zone below 10,000 ft.

The Texas Co. Starts Southeast Midway Well

The Texas Co. is grading roads for Pioneer Unit Plan No. 2 to be drilled near the southeast corner of the northwest quarter of sec. 33,11s-23w in the southeast Midway-Sunset area. The project is located 1600 ft. south of the company's P.U.P. No. 1 which was abandoned at 8869 ft. in 1938 after encountering hard Eocene sand with a slight cut and odor at 8388 ft.

Standard Starts Six Well Program

Standard Oil Co. has received the necessary certificates for a six-well heavy oil producing program in the Kern Front-Premier area. First to get under way will be No. 42-9 now rigging up 990 ft. south and 330 ft. west of the north quarter corner of Standard's fee owned section 9, 28s-27e. The well seeks extension of the heavy oil now produced along the westerly section line.

Two Wells Start At Antelope Hills

In the immediate wake of Shell Oil Co.'s discovery of large volume heavy oil production in the Antelope Hills, some six miles west of the south tip of the North Belridge field, two wells are turning to the right. First to get under way was Shell's Williams No. 67-6, located southeast of discovery in sec. 6,28s-20e, and last reported at 1717 ft. The second is Chanslor-Canfield Midway Oil Co.'s Antelope Fee No. 7-1 now drilling in the grass roots near the north line of the adjacent section 7 of the township.

The discovery well, Williams No. 45-6, after demonstrating a 950 bbl. capacity from 2340 ft. was shut in. Last production was reported at 142 bbls. of 16.4 gravity oil cutting 16.0% in 11½ hours. The bean during the flow was reduced from 16/64 to 5/64 in. while flow pressure averaged 45 lbs.

Midway Continues Heavy Oil Drilling

The Midway-Sunset area is experiencing a drilling flurry under the stimulus of official approval by the Office of Petroleum Coordinator. Among the new projects scheduled for this shallow heavy oil producing area are Midway No. 29-26 in sec. 26, 31s-22e and well No. 1-2 in sec. 2,32s-22e by the Chanslor-Canfield Midway Oil Co. Also entering the play is Doyle Petroleum Co. now rigging up to drill well No. 1 some 1100 ft. southeast of the east quarter corner of sec. 3,31s-22e.

SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
	Fresno County				
Burrel	Amerada Pet. Corp., Truman	4-6	6, 17-18	7831	Drilling
	Richfield Oil Corp., Schultz	1	27, 16-18	6538	Drilling
Cantua Creek	Richfield Oil Corp., McDonald	1	32, 16-16	9100	Abandoned
Guijarral Hills	Lytle, Robt. S., Opr., Well	68-28F	28, 20-16	9456	Drilling
Helm	Amerada Pet. Co., Weyant	37-27	27, 16-17	635	Drilling
Jacalitos	Wilshire Annex Oil Co.	23-26E	26, 21-15	3787	Idle
Mendota	Jergins Oil Co., Cheney Ranch	3	30, 14-13	6262	Drilling
Riverdale	Amerada Pet. Corp., Clemente	74-22	22, 17-19	100	Drilling
	Amerada Pet. Corp., Zanolini	38-23	23, 17-19	606	Drilling
	Amerada Pet. Corp., Lawton	58-26	26, 17-19	9234	Drilling
	Amerada Pet. Corp., Leal	34-26	26, 17-19	6915	Wet-Idle
	Kern County				
Antelope Hills	C.C.M.O. Co., Antelope Fee	7-1	7, 28-20	100	Drilling
	Shell Oil Co., Inc., Williams,	45-6	6, 28-20	2340	Completed
	Shell Oil Co., Inc., Williams	67-6	6, 28-20	1717	Drilling
Comanche Point	Ellington, L. E. Assoc., Well	1	31, 12-18		Grade
Devils Den	Moran, Robt. B., Opr., Beer	1	19, 26-19	1147	Drilling
Edison	M.T.M. Associates, Well	1	23, 30-30	956	Fishing D.P.
Grapevine	Reserve Oil & Gas Co., Tejon	33-5	33, 11-19		Location
	Richfield Oil Corp., Tejon Ranch	3	7, 10-19	5820	Drilling
Kern Front	Standard Oil Co., Well	42-9	9, 28-27		Rigging Up
Kettleman-So.	Bristol Oil Corp., Hellman	1	2, 25-19	2174	Idle
McKittrick	Americal Pet. Inc., Americal	1	2, 30-21	1506	Prep to deepen
Midway-SE.	The Texas Co., Pioneer Unit Plan	2	33, 11-23		Grading
Mt. Poso	Alpha Oil Co., C. V. Elliott	1A	1, 27-28	1398	Abandoned
	Delaney, Fred G., Well	1	12, 27-27		Location
Paloma	General Pet. Corp., Gallagher	61-33	33, 31-26	1816	Prep to resume
	Western Gulf Oil Co., L. A. Club	36-1	1, 32-26		Foundation
Shale Hills	Tideland Oil Co., Grant Est.	1	4, 27-28	4064	Stdg. cemented
	Kings County				
Pyramid Hills	Miesse, Richard S., Jackie	1	22, 24-17	315	Drilling
	Pac. O. & G. Dev., West Slope	2	20, 24-18		Location
	Tulare County				
Terra Bella	Stout, Geo. W., Stout	2	11, 23-27	745	Idle
Trico	Trico Oil & Gas Co., Lee	1	17, 24-23		Rig
Tulare	Richfield O. Corp., N. Tulare Com.	1-1	33, 19-24	5356	Abandoned

The Texas Co. is also grading for Fee No. 103 northeast of the west quarter corner of sec. 36,31s-22e.

Latest of the General Petroleum Corp. wells to finish in the area was Moco No. 35-351 in sec. 35,12n-24w which was completed in the Monarch zone at 945 ft. pumping 32 bbls. of 13.4 gravity oil cutting 19%. The company is completing No. 35-356 in the same section from 1065 ft. and is preparing to drill No.'s 34-357 and 35-343.

The H & T Oil Co. well No. 5 in sec. 35,32s-23e is standing with 8⅝ in. casing cemented over the oil sand at 770 ft. after bottoming at 1435 ft. National Oil Co.'s well No. 4 in the same section is redrilling with cable tools at 1750 ft. after once bottoming at 1808 ft. The company's No. 6 is fishing bailer from redrilled depth of 2120 ft.

Signal Delayed At Mount Poso

Signal Oil Co. is waiting for power lines to be run in for pumping equipment before completing Glide No.'s 23-1 and 23-2 on their new productive pool in sec. 23,27-28. The former bottomed at 1532 ft. after finding the Vedder zone at 1485 ft. while the latter stopped at 1488 ft. after penetrating only 7 ft. of zone.

In section 26 of the township C.C.M.O. is drilling Mon No. 4 at 150 ft.

Standard Drills Orcutt Wildcat

Standard Oil Co. Rice Ranch No. 1, located in sec. 14,9n-34w east of Orcutt, is drilling in sand and shale below 4625 ft. The well seeks a new oil accumulation northeast of the old field.

Shell Finishing Ten Section Well

In the northeast corner of sec. 31,30s-26e Shell Oil Co. is again drilling KCL No. B-71-31 after suspending in January at 5619 ft. under the regulations of order M-68. Last depth on the delayed project was reported at 7415 ft. The pay in this area is from the Stevens zone at approximately 8000 ft.

New Cat Canyon Well Completed

Union Oil Co. finished Bell No. 14 in the Cat Canyon field flowing a 650 bbl. rate from 5807 ft. Located in sec. 27,9n-33w the well was cased with a 7 in. combination string including 646 ft. of perforations to 5805 ft. and cemented through perforations at 5149 ft. With 2½ in. tubing hung at 5747 ft. the well was completed flowing an initial 593 bbls. of 16 gravity clean oil in 22 hours through a 2 in. bean.

In sec. 1,8n-33w Pacific Western Oil Corp. has graded location for Los Alamos No. 18.

Richfield Oil Drills Carrizo Plain Wildcat

Stepping out into unexplored territory 12 miles southwest of McKittrick, Richfield Oil Corp. is drill-

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ing a wildcat well on the Blakey property in the southwest quarter of sec. 20,31s-20e in San Luis Obispo county. The project is located near the main road running through the Carrizo Plain and about five miles northwest of Barnsdall Oil Co.'s KCL No. 1 which was abandoned at 5220 ft. some years ago. The drilling is being done under contract by Bell & Loffland and bottom was last reported at 1311 ft.

Piru Area Work Yet Continues

Pacific Western Oil Corp. completed Temescal No. 11 in sec. 4, 4n-18w near the Ventura-Los Angeles County line and is already moving a quarter of a mile east to drill No. 12. The hole was bottomed in 45 degree dips at 3267 ft. after cementing 7 in. casing at 2766 ft. A liner perforated from 2779 to 2982 ft. and 3177 to 3262 ft. was landed at 3262 ft. Completed on the pump on the 26th of April the well was last reported making 252 bbls. of 19.8 gravity oil cutting only 7.0 per cent.

On the Ramona anticline near Piru, Continental Oil Co.'s Holser No. 1 seeks a new field in sec. 14,4n-18w. When last reported the well was at 4022 ft. in shale with occasional oil showings.

Delroy Petroleum Corp.'s Fisk Core Hole No. 3 in sec. 22,5n-18w is now idle in hard gray sand at 2280 ft.

Wilshire Redrill Shows Little Fluid

Jacalitos Hills well, No. 23-26E in sec. 26,21s-15e, is standing idle after fluid entry was checked at 2 bbls. of mud and oil per day.

This well was redrilled and whipped to the northeast from 1020 ft. after a straight hole found only 3 ft. of oil sand at 3621 ft. Bottoming at 3787 ft. after finding the top of the sand at 3750 ft., 5½ in. casing was cemented at 7345 ft. and successfully squeezed when the original water shut off proved incomplete.

Operators Test Eureka Canyon Try

L. H. Phillips & D. H. Nichols are testing well No. 1 in sec. 33,4n-18w north of the Union Oil Co. fee property at the east end of the Eureka Canyon field. Employing cable tools, the well was drilled to 242 ft. where it is being bailed for an open hole test.

Shell Oil Co. Finishes Good Raisin City Well

Again demonstrating the unpredictability of the Raisin City field, Shell Oil Co., Inc. completed Santa Ana Fresno Land No. 33-19 on what appeared a down structure location in sec. 19,15s-18e flowing clean 23.9 gravity oil at a 360 bbl. rate through a 16-64 in. bean with 120,000 cu. ft. of gas.

The well was completed at 5245 ft. after a 65 minute formation test from 5200 ft. to bottom resulted in a 4128 bbl. rate flow. The excellent results from this well are an indication that what heretofore was considered a geographically small field may prove to be materially larger.

At the northwest flank of the field in sec. 13,15s-17e the Seaboard-Tide Water-Union Oil Co. combination is testing No. 86-13 after bottoming at 5320 ft. plugging to 5232 ft. and cementing 7 in. casing at 5214 ft. The gas sand was found at 4991 ft., the Shell sand at 5003 ft. and the "88" sand at 5126 ft. Gun perforated from 5096 to 5116 ft., a 5 minute test recovered 1500 ft. of 22 gravity oil. Again perforated from 5130 to 5140 ft. and with packer at 5108 ft. the tester recovered 2634 ft. of 24 gravity oil in one hour. Finally gun perforated from 5110 to 5120 ft. and with packer set above all perforations, the well tested wet. The final perforations were squeezed and with a wire-wrapped liner in the hole the well recovered only a small amount of sand and fluid. After gun perforating from 5085 to 5105 ft. and 5130 to 5140 ft. the well flowed salt water and a trace of oil at a 1000 bbl. rate. Operators are presently squeezing off the lower gun perforated interval.

Lloyd Corp. Recompletes Flank Discovery Project

Flowing 450 bbls. a day of 32 gravity oil and 394,000 cu. ft. of gas, Lloyd Corp. recompleted its No. 2 at Ventura Avenue from the plugged depth of 9145 ft. This well started a wave of activity on the north flank of the field when it blew in flowing 2250 bbls. a day while pulling drill pipe. After flowing for three years, the well died during March of this year and was cleaned out to 9480 ft., just above the old casing shoe. A cement plug was placed at 9145 ft. and the casing perforated from 8805 to 8865 ft.

Tide Water Associated Oil Co.'s Lloyd No. 70 was finished at 7785 ft. with a maximum rate of 550 bbls. of 31 gravity clean oil.

Tideland Lists Water Shut-off

Tideland Oil Co.'s Grant Estate No. 1, in the northwest corner of sec.4,27s-18e of the Shale Hills area, is testing after cementing 7 in. casing at 3589 ft. Total depth is 4064 ft.

Pyramid Hills Well Making Hole

Richard S. Miesse's Jackie No. 1, in the northwest quarter of sec. 22, 24s-17e on the Sunflower Anticline, is drilling in blue shale at 315 ft. The well is making a shallow test of a 1600 acre block.

Lytle Tests Eocene Sand

Robert S. Lytle, Operator, in combination with Seaboard and Honolulu Oil Corp. in the Guijarral Hills wildcat No. 68-28F, recovered only gassy fresh water and a trace of distillate on a formation test of Eocene sands from 9420 to 9456 ft. and is deepening at 9500 ft.

Coastal District

A. E. Bell Corp. Plans To Drill Cat Canyon

Alphonzo E. Bell Corp. is building roads and grading the rig site preparatory to drilling Williams No. 1 in the southwest quarter of sec. 25,9n-33w at West Cat Canyon. The old field was developed only at its northern and southern extremities leaving an area of more than a square mile in the middle with only a single well, Union Oil Co.'s Bell No. 10. The new location of Alphonzo E. Bell Corp. appears to be well upon the eastern flank of the four mile long field and could be productive in the Sisquoc (old producing horizon) or in the underlying Monterey Chert which is prolific in sec. 27 a mile and quarter to the west.

In sec. 1,8n-33w at the southeast end of West Cat Canyon, Pacific Western Oil Co. is planning to drill Los Alamos No. 18. Primary object will be to test the Monterey on the west flank of the field at its southern end in a structural position similar to the successful wells of Standard Oil Co. and Union Oil Co. in sec. 27,9n-33w.

Union Gets Big Well At West Santa Maria

With initial production gauging 1080 bbls. in 13 hours, Union Oil Co. completed another big well at the far west end of the Santa Maria Valley field. The project, Union Sugar No. 13, offsets O. C. Field Gasoline Co.'s Brown No. 1 and was brought in with a casing pump from 300 ft. of formation open to 5340 ft. Union's Moretti No. 3-2 and the Field Brown No. 1 each came in for about 1200 bbls. a day.

W. R. Girard and L. T. Thompson hold an adjacent piece of the Brown property and are reported to be planning early development.

In the southerly portion of the old area, R. R. Bush Oil Co. and Hancock Oil Co. completed their Bradley No. 8 at 5129 ft. flowing 1115 bbls. of 14.5 gravity oil cutting 4.1%. Only active operators at the present time are Union Oil Co. which is drilling Union Sugar No. 14 and Moretti No. 3-4 in the westerly section and Signal Oil & Gas Co. which is working on Yelkin No. 8.

Shell Oil to Drill Red Mountain Test

Seeking a new field north of the west end of Ventura Avenue and northeast of San Miguelito, Shell Oil Co. is grading roads to a location for Wood No. 1 on Red Mountain. The site is approximately 7500 ft. north and 14,000 ft. west of corner No. 11 of Rancho Canada Larga, the point from which Ventura Avenue wells are located.

Grimes Canyon Well Makes Production Test

Ventura Southern Oil Co. McCampbell No. 1, located in Grimes Canyon south of Bardsdale, is making a production test after plugging bottom from 4179 ft. to 4130 ft. and cementing 6⅝ in. casing at 4005 ft. First trial is of a sand phase at the base of the Vaqueros which looked good in both electric log and wall samples. If production is not ob-

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
	San Luis Obispo County				
Carrizo Plains	Richfield Oil Corp., Blakey	1	20, 31-20	1311	Drilling
	Santa Barbara County				
Cat Canyon	Alphonzo E. Bell Corp., Gilmore	1	23, 9-33	6457	Idle
Casmalia	Dolly Adams Oil Co., Morganti	2	13, 9-35	1670	Idle
Lompoc	Alphonzo E. Bell Corp., Lompoc	6	28, 8-34		Graded roads
	Fickert Oil Co., Ltd., Well	1	8, 7-33		Rig
Los Olivos	Phillips & Nichols, Well	1	33, 4-18	242	Bailing
Orcutt	Standard Oil Co., Rice Ranch	1	14, 9-34	4618	Drilling
	Ventura County				
Bardsdale	Hopland Oil Co., Well	1	1, 3-19	4634	Idle
	Santa Marino Oil Co., Elkins	1	7, 3-19		Grade
	Ventura Southern Oil Co.	G-1	19, 3-19	4179	Testing WSO
Conejo	Sycamore Oil Co., Boylan	1	23, 1-20	1910	Drilling
Eureka Canyon	Tide Water Assoc. O. Co., Davis	1	33, 8-31		Foundation
Ojai	Coates, Spencer D., Pirie	5	7, 4-22	665	Drilling
	Kelalee Pet. Co., Harvey	1	8, 4-21		Rig
	Richfield Oil Corp., Ojai	44	13, 4-22	8645	Swabbing
Piru	Continental Oil Co., Holser	1	14, 4-18	4022	Drilling
	Delroy Pet. Corp., Fisk Core Hole	1	22, 5-18	2280	Idle
	Pacific Western Oil Co., Temescal	12	4, 4-18		Prep to spud
Red Mountain	Shell Oil Co., Inc., Wood	1	7, 3-23		Grading roads
Sespe	Alford Drlg. & Expl. Co.	1	18, 4-19	2581	Idle
	Highland Drilling Co., Cosby	1	14, 4-19	1996	Idle
	Ivers, H. A. Kentuck	13½	1, 4-20	1560	Drilling
	Volunteer Pet. Co., Tar Creek	3	28, 5-19		Location
	Volunteer Pet. Co., Phillips	2	29, 5-19		Location
Timber Canyon	Crude Oils, Inc., West	1	19, 4-20	958	Idle
	Denison, A. T., Denison	1	13, 4-21	1630	Drilling
	Henderson-Ortez Oil Co., O'Leary	1	29, 4-20		Rig
Torrey Canyon	Union Oil Co., Torrey	60	5, 3-18		Location

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Colusa	Pacific National Pet. Corp.	1	17,17n-4w	1402	Idle
Contra Costa	Tide Water Assoc., Bethel Is.	1	9. 2n-3e	4002	Drilling
Madera	Blake. T. E. Chuck	1	28, 10s-17e		Rig
Merced	T.W.A.-Seaboard-Turlock Ld.	37-18	18, 6s-11e		Grade
Monterey	Loma Grande Oil Co., Corey	1	23,24s-10e	4180	Drilling
San Joaquin	Standard Oil Co., Blewett Com.	3	23, 3s-6e		Rig
Solano	Standard Oil Co., Suisun Com.	2-1	25, 3n-1w	254	Drilling
Sonoma	Standard Oil Co., Petaluma	2-1	9, 5n-7w	1631	Abandoning
Stanislaus	Don Pedro Oil Co., Newman	1	9, 6s-9e	4074	Testing WSO
Sutter	Buttes Oilfields, Inc., Buttes	8	28,16n-2e	5561	Testing
Yuba	Wright, L. G., Cox	1	18,14n-5e	1805	Idle

tained at this level trials will be made of Pico sands at 1100 ft. and of a Modelo interval at 3200 ft.

San Marino Oil Co. which recently recompleted its first well in sec. 7,3n-19w at 1600 ft. is planning to drill a second within the next few weeks.

Richfield Tests Deep Ojai Project

Richfield Oil Corp. is making a production test in Ojai No. 44 after giving the project up as a deep test and plugging bottom from 8755 ft. to 5411 ft. A 4¾ in. combination string including 81 ft. of perforated on bottom was run to 5411 ft. and cemented through perforations at 5320 ft. At last reports the well was swabbing with the fluid at 2700 ft. and showing gas and oil.

Northern Try Cores Eocene Gray Sand

Richfield Oil Corp.'s McDonald Estate in the Cantua Creek area was abandoned at 9100 ft. in hard Eocene shale after passing through a gray Eocene sand zone from 8000 to 8884 ft. The Kreyenhagen was found at the 7871 ft. level.

Located in sec. 32,16s-16e some four miles northeast of the Turk anticline in Fresno county, the well sought production in an area long considered promising but which, despite repeated attempts, has not yet yielded commercial production. The nearest thing to production was some 35.8 gravity oil recovered on tests of the Temblor section by Western Gulf Oil Co. in sec. 3,17s-15e.

Safe Practices for Cleaning Tanks

Recommended safe practices for cleaning crude petroleum and gasoline storage tanks are described and illustrated in two manuals published by the American Petroleum Institute's Department of Accident Prevention.

The manuals, which are a revision of the single manual previously issued, give in detail the procedure recommended for cleaning tanks, the dangers involved, and the protective equipment which should be used.

Section A, "Crude-Oil and Unfinished-Products Tanks," covers petroleum-vapor fires and explosions; sources of combustible vapor mixtures; sources of vapor ignition, toxic gases and vapors; oxygen deficiency; use of tools, planning and inspection; draining and isolating tank; removal of gases and vapors; opening tank; iron-sulfide deposits; removal of sediment; testing for vapor or gas; and how tests are made. Protective equipment is described, and recommended safe practices and precautionary measures are listed.

Section B, "Gasoline Tanks," covers in general the same subjects, but with special emphasis on the different hazards, the smaller tanks often involved, and the extra precautions necessary with leaded gasolines.

Copies of the two manuals may be obtained from the Institute, 50 West 50th Street, New York. Price is 25 cents each.

Axelson Store In New Dress

Word from E. J. Phillips, manager of Axelson Manufacturing Co.'s store in Taft, indicates that he is particularly proud of the natty new appearance the store has recently acquired—so much so that he sent us the photograph shown here. According to Mr. Phillips, the remodeling and redecoration was timed and completed to celebrate the company's 50th anniversary.

This year rounds out 50 years of service to the petroleum industry for Axelson. As new fields were developed, supply outlets were increased and today, Axelson sales and service in the far West include stores at Bakersfield, Taft, Long Beach, Torrance, Huntington Beach, Santa Fe Springs, Orcutt and Ventura. And, as Axelson's products increased and improved, their scope of operation extended beyond California and came to include not only the Mid-Continent and Eastern oil fields of the United States, but those of foreign fields as well. By 1925 Axelson interchangeable pumps and sucker rods were in use in every producing oil field throughout the world.

Franks Introduces New Portable Rig

This 84-foot derrick portable truck-mounted drilling rig, so constructed that the top section may be quickly and easily removed for long moves, is one of the latest developments of the Franks Manufacturing Corp. of Tulsa, whose California distributors are Hillman-Kelley, of Los Angeles.

The photo above shows the rig with the full 84-foot derrick folded down over the truck for short location-to-location moves. In the inset the rig may be seen with the top section removed for longer moves.

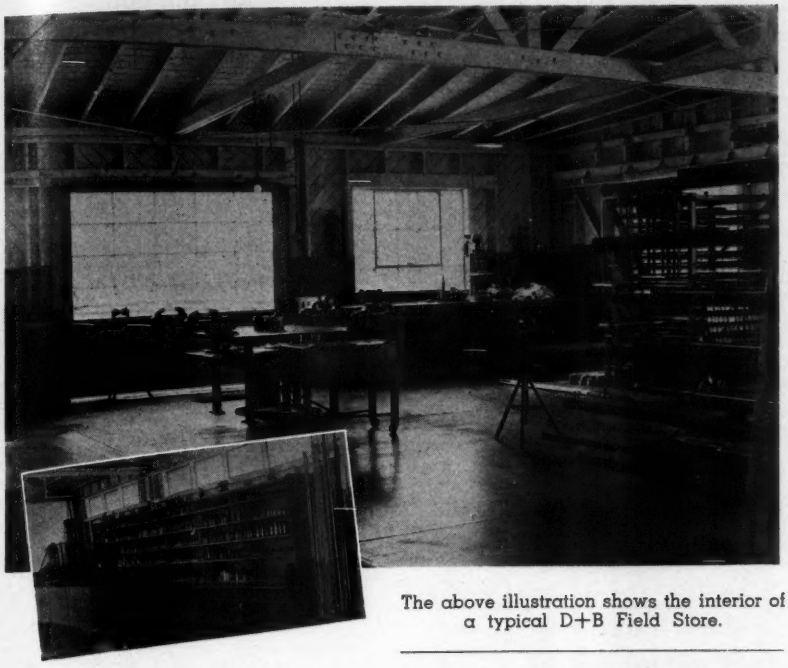
The top section is securely fastened on by means of self-aligning tapered plugs and bolts in a joint that is entirely rigid. Positive alignment is obtained.

The derrick sections are fastened together on the ground before the derrick is raised to working position by means of the Franks patented screw-raising device. Driven by the powerplant of the unit, this device makes it possible to have the derrick in working position within five minutes. No auxiliary engine, pumps, hydraulic lines, or cylinders are needed.

The derrick is of open face design, and is completely electrically welded and of light weight construction. It has a capacity of 150,000 lbs. and is capable of drilling to 5,000 feet "slim-hole."

The Franks rig is arranged for three-man operation without lessening drilling speed or working undue hardships on the men.

D + B ACQUIRES HOFCO PUMP, LTD.



The above illustration shows the interior of a typical D+B Field Store.

The D+B Division of Emsco Derrick & Equipment Co. has recently acquired the complete stock of Pumps, Fittings and Pump Accessories of Hofco Pump, Ltd., Long Beach, Calif.

Fast, efficient, 24-hour service and a complete line of replacement parts will be available for Hofco Pumps at all D+B Field Stores in California. These stores are conveniently located at Torrance, Long Beach, Huntington Beach, Santa Fe Springs, Taft, Bakersfield and Ventura, and feature modern up-to-the-minute service equipment.

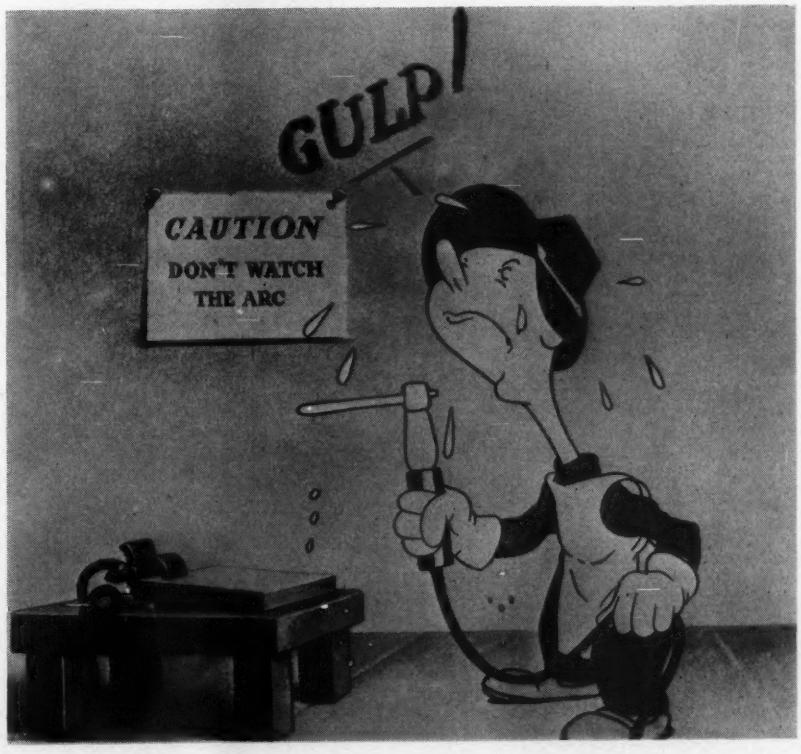
Welding Training Movie Available from G. E.

Oil men who are training welding operators or whose experienced welders would like to have a little "refresher course" in the fundamentals of arc welding will be interested in a series of full color, talking, welding training film being released by General Electric.

The series, entitled "The Inside of Arc Welding", employs virtually every modern device of the motion picture industry including cartoons of "Joe Magee," the welder, animations and demonstrations of good and poor welding technique. Each of the six 10 minute parts is complete in itself and covers in full detail one particular phase of arc welding. Part I, which is now available, deals entirely with fundamentals. Part II, to Part VI inclusive, which will be available about June 15, show the recommended procedure for "Flat" position, "Horizontal" position, "Flat" and "Horizontal" with A-C, "Vertical" position, "Overhead" position.

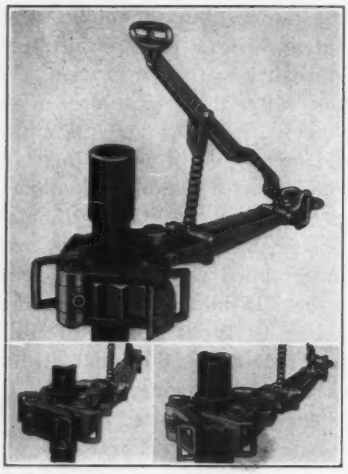
Welding instructors estimate that the film will reduce the time required for training men to weld by 20%. They feel that experienced welders will not only enjoy "seeing themselves as others see them" in these movies, but should be helped in their efforts to combine speed and quality in their operation. The films, with their close-ups of the behavior of the arc and the molten weld metal give a clear, illustrated explanation of welding phenomena that, due to the technical difficulties involved, have not been previously photographed with the detail found in the "Inside of Arc Welding." Rapheal G. Wolff Studios of Hollywood solved the technical difficulties and is producing the series under the supervision of the General Electric Welding Laboratories, with the co-operation of government and industry representatives.

The films will be loaned for single showings without cost. To those having such use for the picture that they would like to have it available at all times, copies will be supplied at print cost.



New BJ Tong Fits Wide Range of Sizes

By providing multiple steps for latching, and multiple jaws for flexibility, the recently designed BJ Type B and Type C Rotary and Casing Tongs handle a wide range of pipe sizes by merely installing the proper size latch lug jaw. Regardless of the pipe diameter, all jaws



contact the pipe and exert uniformly equal pressure.

Each Type B Tong can be equipped with any one of four different latch lug jaws which fit sizes respectively as follows: 3½ in. to 5 in.—4¼ in. to 6¾ in.—6⅝ in. to 9 in.—9 in. to 10¾ in.

Each Type C Tong will fit all pipe and tool joint diameters from 2⅜ in. to 8⅝ in. by installing the proper size latch lug jaw.

It is immediately apparent that the investment in tongs can thus be held to a minimum merely by having the required extra latch lug jaws on hand.

The modern design which enables these tongs to fit such a wide range of sizes, and at the same time maintain uniform contact around the pipe provides contacting radial cam surface on the end of the lever and the rear face of the short jaw, and the mounting of hinge pin for the short jaw in a sliding block in the lever. The short jaw is thus held in proper position to form, in conjunction with the other jaws, a true circle for all pipe sizes within the range of the tongs.

A successful new latching mechanism is provided by equipping the latch lug jaw with two or more steps, and the strong stirrup-type latch is readily closed to the proper step for tonging the particular size of pipe handled. The latch is held securely closed by TWO compression springs which are enclosed within the jaw and well protected. By providing TWO springs the force is divided, and maximum service is secured before replacement is required.

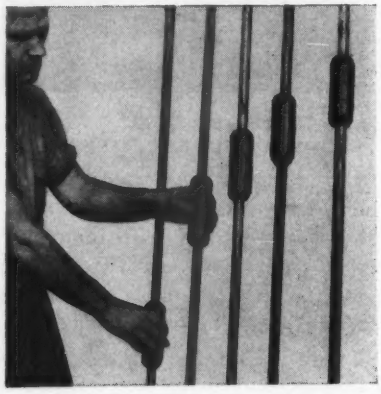
A new head-and-nut type solid hinge pin is used in the Types B and C Tongs, and all female bosses are recessed at top and bottom to bring both the head and nut of all hinge pins flush with the outside face of the jaws. Dowel pins are inserted through the slotted heads of the hinge pins which are thus rigidly attached to the female hinge of the jaws.

Additional features include: recessed grease gun connections for proper lubrication; a sturdy, rigid-type suspension which balances the tong perfectly, and collapses flat on top of the lever when the tong is to be transported from one rig to another; a special short lever for the Type C Tong, which is ideal for clearing the girts on portable rigs.

The manufacturers, Byron Jackson Co., at Los Angeles, Houston, or New York, will supply any additional information desired.

Present New Type Sucker Rod Protectors

A new type of slidable sucker rod protector molded from a special wear-resistant material has been developed by Patterson-Ballagh Corporation. The protector is molded directly onto the polished rod of a standard pony rod. They have just enough clearance so that the rod will slide inside of the protector instead of against the rough tubing. The rod is smooth and the protector is a plastic bear-



ing surface. Using oil as the medium of lubrication, the unit operates as an underground polish rod. The manufacturer claims that the application reduces pumping load, and field tests indicate that the protector solves the worn rod box and tubing problem. The protectors fit pony rods, sizes ⅝ to 1″. Details can be obtained from the manufacturer.

Wellman Appointed B and W Distributor

W. J. Wellman

B and W, Inc., of Houston, Texas, have appointed WELLMAN, 405 West First Street, Odessa, Texas, as their distributor for Wall Cleaning Guides in the West Texas and New Mexico area.

In addition to carrying complete stocks of this equipment, Wellman will furnish service, without additional charge, to assist operators in establishing proper Guide placement when installing on the rig, and throughout the cementing operation.

Lane-Wells Publishes New Packer Bulletin

A completely new Bulletin on Olympic Packers and Liner Hangers has been announced by Lane-Wells Co., according to M. E. Montrose, vice-president and general sales manager.

The new Bulletin catalogues nine types of Packers and three types of Liner Hangers for oil and gas well applications.

Outstanding features of the Lane-Wells Olympic Packers, according to type, include: positive controls which makes it possible to set and reset the packer when and where desired: simplified construction; multi-set packing rings; packing ring support sleeve; long tapered dove-tailed slips; cross-cut slips and free wheeling cage assembly.

Applications and specifications are given for Flow Type Packers, for fluid and gas lift operations, and Upper Packers, for well testings and washing operations.

Copies of the Lane-Wells Olympic Packer Bulletin are available from Lane-Wells Co., 5610 South Soto Street, Los Angeles, Calif.

New Bulletin Features Boiler Level Controllers

Boiler Feed Water Level Controllers, designed on the cantilever principles, are featured in a new bulletin just issued by J. A. Campbell Co., 651 Wardlow Road, Long Beach, Calif. Two improved types of Controllers are presented,—pilot-operated and rotary types. Adoption of the cantilever principle multiplies expansion and contraction in the tube by six, which permits wide range of movement for valve motivation and makes possible the use of a much smaller valve, according to the manufacturer. The Bulletin also describes other recently introduced products of the company, including the Campbell Micro-Bean, which is a universal pulsation dampener for eliminating vibration of gauge needs and provides sensitive valving to pump governors; thermometer wells made of stainless steel; gas samplers; and feet gauge strips. The latter are cast in 12-in. lengths for mounting on a surface board to be fastened to tanks. The numerals can be arranged to read up or down.

Wickwire Spencer War Aid Bulletin

Wickwire Spencer Steel Co. has just issued a new 24-page booklet: "Something about Our Job in Helping to Win the War."

This booklet was published to help win the war, by showing the company's employees how the products they turn out are actually used in military combat.

The company also wanted their customers, suppliers and the stockholders to be posted up to the minute on their contribution to the total war effort.

A copy will be sent to anyone who requests it on his letterhead.

Edwin J. Schwanhausser Now Worthington Director

Edwin J. Schwanhausser, of Buffalo, New York, vice-president, Worthington Pump and Machinery Corp., has been elected to the corporation's board of directors, filling a vacancy created by the death of Edward T. Fishwick.

Mr. Schwanhausser has been a vice-president of the corporation since 1939, and a member of the Worthington organization since his graduation from Stevens Institute of Technology in 1915. For 14 years he was connected with the Harrison, N. J., Works, being appointed assistant manager in 1927. In 1929 he was appointed manager of the corporation's Buffalo Works, and was advanced to the position of vice-president in 1939, assuming in addition to general administrative duties, responsibility for directing the corporation's sales of diesel and gas engines. Prominently identified for many years with civic activities, Mr. Schwanhausser served in 1937 and 1938 as president of the Buffalo Chamber of Commerce. He is a trustee of the Buffalo Savings Bank, and a director of Electro-Refractories and Alloys Corp. of Buffalo.

In addition to Mr. Schwanhausser, all retiring directors of the corporation were reelected at the annual meeting of stockholders held in Wilmington, Apr. 29.

New Baash-Ross Tools Safeguard Drill Strings

It has always been good oil field practice to take whatever steps possible to protect a drilling string against loss. But under the present rigid curtailment of drill pipe, it is absolutely imperative that every precaution possible be taken to safeguard against loss of drill pipe in an emergency.

The Baash-Ross Tool Co. has recently announced two important new developments that are of particular interest to oil operators at this time, for they safeguard against drill pipe loss and minimize costly fishing operations when drilling in troublesome formations.

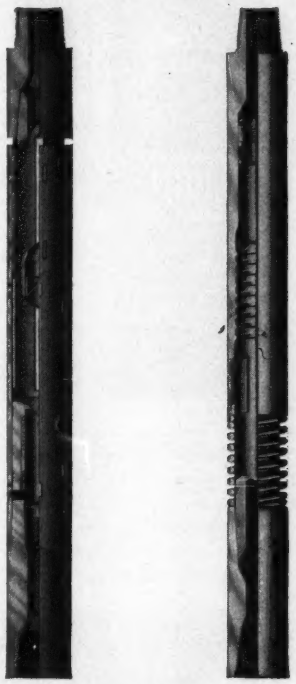
One of these new tools—the Baash-Ross Drilling Type Bumper Sub—enables the operator to jar his way out of trouble and is particularly recommended for use in sticky formations, key seats, etc. The second tool—the Baash-Ross Type "E" Autolock Safety Joint—is particularly recommended where formations are apt to cave, making jarring operations of no value. With this joint the operator can **unscrew** the string above the stuck portion, thus insuring recovery of at least a major portion of the pipe.

Bumper Sub Details

The Bumper Sub is run as a part of the drill string, directly above whatever point is apt to stick—the bit, reamer, collar, etc. With it the operator can strike either a downward or upward blow to free the string. Operation is simple and the blow is under positive control of the operator at all times.

The tool has been particularly designed to meet the requirements of modern drilling operations. It is made of carefully selected steels, heat-treated to produce maximum physical properties, and will stand any force—in either direction—that the drill string is capable of delivering. The splined area through which the torque load is transmitted is rugged and over-size to give ample strength for the most severe operations. In addition, the tool has removable splined inserts that may be quickly replaced when worn, thus insuring long life and low maintenance.

The Bumper Sub is sealed against leakage by a packing arrangement that is especially designed to hold even high circulating pressure without leakage—a feature that is particularly important in modern drilling operations.



The Baash-Ross Bumper Sub is available in both right and left-hand types in all popular drill pipe sizes, including both regular and full hole.

Safety Joint Features

The Baash-Ross Drilling Type Safety Joint embodies a number of unique features particularly valuable in present day drilling work. It can be used at any point in the drill string, is made to rotate in an unscrewing direction without danger of accidental release . . . yet it unscrews quickly and easily at the will of the operator.

The Joint has a series of driving shoulders around the full circumference of the tool to provide ample driving area for heavy torque loads. In addition, the locking shoulders are so designed that when the Joint is made up, they will mate in only the correct position. This eliminates the possibility of overtightening or "freezing" the Joint and insures quick, positive release whenever desired. Packers prevent fluid leakage while drilling and are so designed that SIX unscrewing turns can be effected **without losing the fluid seal.**

SAFE, POSITIVE RELEASE—The Type "E" permits reverse rotation, when necessary, under normal conditions, as the reverse torque is transmitted through the heavy, spring-loaded collar and tapered shoulders. Yet, when release is desired, it requires not more than half the torque needed to break a normally made-up tool joint of the same size.

The Baash-Ross Type "E" Safety Joint is stronger than the drill pipe in which it is run and will safely transmit all driving torques. It is available in all popular sizes of pipe including both regular and full hole.

General Electric Adds to Line of Tri-Clad Motors

Three new motors—a vertical general-purpose polyphase motor, a vertical shielded polyphase motor (1 to 20 hp.) and a vertical shielded single-phase motor (1 to 5 hp)—have been added to the General Electric Tri-Clad family. The shielded-type motors are especially suited to pumping applications, and the general-purpose motor is suitable for use in the machine tool industry as well as for agitators, mixers, and similar applications.

General Purpose Type

The compact, cast-iron frame and cover of the general purpose motors are designed to give added protection to electrical parts, without adding materially to the over-all height. The use of Formex wire, new punchings and coil shapes, double-end ventilation, and balanced design are features contributing to long life.

Accurate alignment of the motor to the driven unit is assured by machined rabbets on the stator frame and base. Rotating weight and thrust are solidly transmitted to the supporting base through the lower bearing, which is fitted to a one-piece base. Bearings are of the deeply grooved type, and are encased in machined cast-iron housings.

All openings in the general-purpose motor are shielded to bar the entrance of chips or other falling objects. Many features of this Tri-Clad motor contribute to convenience of operation. Accessibility of grease fittings allows rapid lubrication without disassembly of the motor; the location of eyebolts makes the motor easy to handle; speed measurements are taken by removing the monogram cap from the upper end shield; a variety of bases makes it possible for this motor to meet many applications and mounting requirements.

The polyphase shielded-type motors are available in either solid-shaft or hollow-shaft construction, while the single-phase shielded-type motors are available only in solid-shaft construction. Both shielded types are for normal-thrust or high-thrust applications. The cover is contoured to deflect dripping liquids and falling objects. All openings in the stator frame and end shields are protected against the entrance of splashing liquids. Air is discharged downward at low velocity, thus permitting little or no dust disturbance around the motor.

These motors are suitable for outdoor operation except where extremes of moisture, dust, or other harmful agents make the selection of fan-cooled motors more economical.

W. E. (Steve) Dunlap Opens New Office

W. E. (Steve) Dunlap, consulting Petroleum Engineer and Geologist, recently moved his office to 406 Subway Terminal Building, Los Angeles.

Fred M. Keller Made Oceanic Oil Manager

W. D. Wilson, vice president of Oceanic Oil Co., announces the appointment of Fred M. Keller to the position of manager of that company.

For the last two years Mr. Keller has been in charge of land operations in California for The British-American Oil Producing Co., from which company he has resigned in order to accept his new position with Oceanic.

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No. 2500 Southwestern casing head plant. Complete unit 80 horsepower Bessemer compressor. J. Hokom Co., Phone HOllywood 3931. tf

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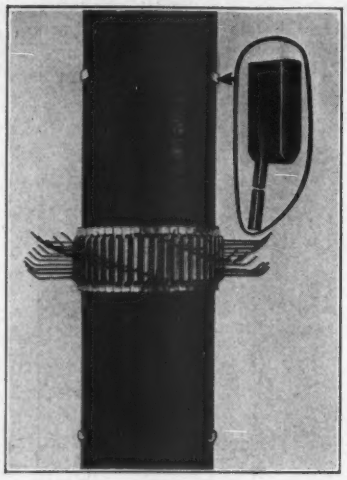
3 Diesel Powered and 2 Steam Rotary Rigs Complete—Also extra boilers, pumps OWS Drilling Units, etc. 13,500 ft. 4½" Hydril drill pipe—Call Jerry Engstrand, Phone AXminister 2-2378, Los Angeles or Karl K. Elliott, 417 Wells Ave., Bakersfield, Calif. Phone 7-7404. 6/5b

Welding Blocks For Wall Cleaning Guides

B & W, Inc., Houston, Texas and Long Beach, Calif., announce the development of welding blocks for B and W Wall Cleaning Guide installations. The use of these blocks speeds up the casing operation.



These new blocks are spaced 14 inches apart vertically, and are welded to the casing to restrict the travel of the Wall Cleaning Guides, but still allow sufficient travel to release the slips without scratching as each joint is run. The blocks are 3/16" x 3/8" x 3/4" long, with a wire handle which is cut off with the arc as each block is welded to the casing.

The Wall Cleaning Guides are packed three to the carton, and six welding blocks per guide are furnished.

Reliance Regulator New Bulletin

Reliance Regulator Corp., Alhambra, Calif., has just issued Bulletin 49 containing information on new Relief Valves, Differential Valves, Back-Pressure Valves and Pressure Limiting Valves. Ten types of Valves are described, covering a range of sizes from ¾ in. to 10 in., for service with either liquid or gas, with a pressure limit up to 225 p. s i. Differential Valves are used extensively for protection of meters and pumps to safeguard them in case they stick, which would create an excessive pressure on these working parts; and as Back Pressure Valves on butane meters to minimize vapor lock in the meters. Pressure Limiting Valves shut off a line at any set pressure and lock the pressure upstream until a new breakable disc is assembled. Relief Valves are used in safeguarding consumers' service on take-offs from high pressure transmission lines and also in conjunction with butane gas plants, vapor recovery systems, farm taps, gasoline plants and refinery installations.

The entire advertising staff of Tide Water Associated Oil Company in San Francisco visited the San Francisco Blood Procurement Center in a group, each member giving a pint of blood in the current national campaign. Top row (left to right) A. M. Arlett, L. A. Buskirk, Mrs. Marquard of American Red Cross; T. A. Norman, Harold R. Deal, advertising manager. Lower row (left to right) J. C. Burnham, H. D. Smith, N. M. Taylor.